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Casting Prevulcanized Latex in Plaster Molds

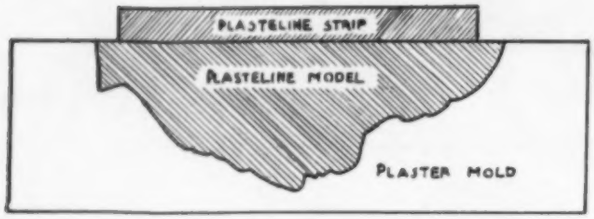
By ADOLPH SILVER

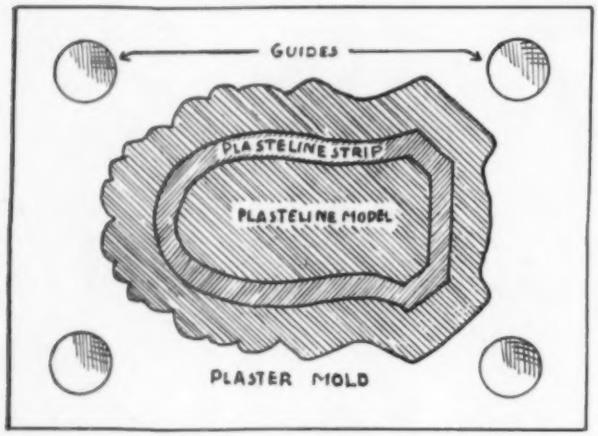
THERE has long been a need for a light, unbreakable, low cost material for casting purposes, one which could preferably be cast in inexpensive molds. Prevulcanized latex, specially prepared for casting, now seems to fill this need. This new latex compound is poured in a dry plaster mold. The walls of the mold absorb the water from the compound, thus forming a crust on the inner mold surface. The latex not in contact with the mold remains liquid. The degree of thickness of the crust deposited on the walls of the mold, as well as the resulting cast, is determined by the length of time the latex compound is allowed to remain in the plaster mold. When the desired crust thickness is attained, the free solution is drained.

Absorption of water by the plaster mold continues after the free solution is drained. There is, however, additional drying of the latex deposit by evaporation through the hollow cast. As the drying continues the crust hardens, shrinks, and finally separates itself from the mold. The latex cast can then be removed from the plaster mold and curing completed by exposure to air. When completely cured, the latex cast is hard but not brittle. As many as twenty-five good casts, with exact reproduction of the finest and sharpest detail, can be made from a single plaster mold.

Availability of latex casting material fills a wide gap in plastic casting materials of all kinds. Although plaster is widely used because of its low cost, both in raw material and in processing, its extreme fragility limits its uses in some fields and makes it impracticable in many others. Papier mâché has been in use for many centuries. In European museums many objects

FIG. 1 (Top)—Original plasteline mask.
FIG. 2 (Inset)—Forming plasteline box.





FIGS. 3 (Top) and 4 (Bottom)—Method of reinforcing the edge of the mold by setting it back on the cast. Guide lines are also indicated.

made from papier mâché, representative of the great art and skill which are incorporated in such objects, are to be found. Molding with papier mâché is at best a difficult procedure. Many of the beautifully colored and highly lacquered art objects of the Japanese, which evoke gasps of admiration, are made of papier mâché. In this country, large scale production of molded objects from paper compositions, similar to papier mâché, exists, but practically all of these composition objects are molded in metal dies by high powered presses.

Because of the high expense of metal molds and the need for still more expensive presses, all of the modern plastics, including rubber, call for large scale production. Because of the low cost of production and the ease of handling, as well as low initial cost, many old and new products are now being cast in latex. Among these are store window figures and displays, ornamental masks, figurines, and plaques. In the home craft and hobby fields, latex is finding application for puppets, marionnettes, models, etc. Even in the hands of a novice, special latex casting materials are giving good results. Some concerns are now supplying schools and universities with three dimension anatomical and biological educational devices cast from latex.

Almost all operations called for by the method of casting latex have been practiced in the ceramic industry for centuries. By substituting clay and water solutions with latex compounds, and firing and glazing furnaces with air or oven drying of latex, the old and ancient craft of the pottery industry is being put to a new and modern use.

The first requirement for latex casting is a good plaster mold of the object to be reproduced. The plaster mold can be made either direct from an original plasteline model, made by an artist or sculptor, or from reproductions in plaster, porcelain, or any other material. Plaster models must be shellacked, then soaped and oiled before making the plaster mold, while porcelain models need only a thin coat of oil. Flat work, such as plaques or masks without undercuts, can be cast in one-piece molds. Round objects, such as busts, statuary, puppets, etc., require molds of two or more pieces.

Making the Plaster Mold

In describing and illustrating one successful method of latex casting, an original plasteline model of a mask is used (Fig. 1). With the model placed on a base board, a strip of plasteline is cut, long enough to form a box with at least a 1-inch margin and wide enough to give a 1-inch surplus over the model itself (Fig. 2).

A sufficient amount of water to fill the formed plasteline box containing the model is placed in a mixing bowl. Plaster is added to the water. It is preferable to add the plaster by sifting it between the fingers to secure a uniform spread. Continue adding the plaster until small islands of plaster appear above the surface of the water.

Allow the mixture to stand for approximately five minutes, then stir until a smooth even mix is secured. Pour half of the mix over the model and then pour it back into the mixing bowl. Break up all air bubbles, either with a brush or by blowing, making sure that no air is trapped in the deep recessions of the model (if any). When the entire surface of the model has a thin coating of plaster, then fill the formed plasteline box with the balance of the plaster mixture. The mixture should be poured from one corner of the box only. Care must be taken at this point not to trap air bubbles on the surface of the model.

It should be pointed out at this point that the ammonia preservative in the latex has a tendency to break down the plaster after a number of casts have been made from the finished plaster mold. Molds made from "pottery plaster," properly handled, will give more good casts per mold than those made from ordinary plaster.

When the plaster in the box has set hard the plas-

FIG. 5—Showing how the strip of plasteline looks when attached inside edge of the mold.

FIG. 6 (Top)—Building up the plaster to the edge of the plasteline strip.

FIG. 7 (Bottom)—After the plasteline model is removed, as shown, the mold must be dried.

teline boxing is removed and the plaster mold is lifted with the model. With the model still in the formed mold, guide marks are scooped with an ordinary spoon or similar device on convenient places on the edge of the mold face.

Latex casts have a tendency to warp at the edges. To overcome this tendency, the edge of the mold is reinforced by setting it back on the cast in the following manner: A strip of plasteline, about one-half inch wide, is attached about one-half inch inside the edge of the model. (See Figures 3, 4 and 5.) A strong soap solution is brushed on the mold edge. When the soap is well absorbed in the plaster, a coat of sweet oil is applied. This will prevent the frame from sticking to the mold.

A plaster mix is now poured over the prepared plaster and built up to the edge of the plasteline strip (Fig. 6). When the plaster has set hard the plaster set-back frame is separated from the mold by tapping the mold gently. The plasteline model is removed (Fig. 7) and the mold dried thoroughly. If only a half-dozen casts or so are needed from the mold these can be made as soon as the mold is dry. If a large number of casts are required, then the plaster mold must be cured.

Curing of the plaster mold is accomplished by allowing the mold to remain exposed to air at least ten times longer than the time required for drying. The time required for drying and curing a plaster mold depends largely on the size and bulk of the mold, as well as the atmospheric conditions in the work room. Where speed is required, the plaster mold can be dried and cured in a hot room or an oven at a temperature of approximately 150° F.

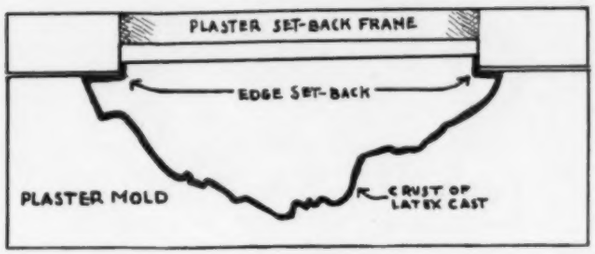


FIG. 8—When the prevulcanized latex solution is poured into the plaster mold, it should be poured to a slightly higher level than the desired cast, as indicated in this drawing.

Casting Prevulcanized Latex

Prevulcanized latex solutions, prepared especially for casting and ready for instant use, are now available. The prepared solution is mixed thoroughly by stirring and is then poured into the plaster mold to a slightly higher level than the desired cast (Fig. 8). As the plaster mold absorbs the water in the latex solution, additional latex must be added to keep the level constant during the time the solution is to remain in the mold. This length of time is determined by the thickness desired in the finished cast, and this in turn is determined by the size of the object to be cast. The larger the object the heavier cast required. For the 1/16th of an inch thickness of the mask casting of the model described, the solution remained in the mold approximately 15 minutes.

After the desired crust thickness is obtained, the solution is poured back into the container and the mold drained of all loose solution. It is then allowed to dry until the latex cast pulls away from the plaster mold. The set-back frame is then lifted from the mold and the cast removed. Figure 9 shows the set-back frame removed and the latex cast object after it separated itself from the mold.

At this stage, the latex cast will be just hard enough to hold its shape. It must be allowed to dry or cure by drying for approximately 48 hours. If a hot room or drying oven is available, curing of the cast can be greatly facilitated.

FIG. 9—Showing the set-back frame removed and the cast latex head after removal from mold.

Making a Two-Piece Mold

To make a two-piece mold, the model is separated with a plasteline flange at the point where the mold is to divide (Fig. 10). Care must be taken that neither half of the mold has any undercuts. Where this is not possible, the mold must be made in as many pieces as needed to free the undercuts. When the model indicates a two-piece mold, the flange must be placed at the widest point extending around the model. With the flange in position, plaster is applied against the model and flange and built up to at least one inch thickness. After the plaster has set the plasteline flange is removed. This will expose the plaster flange that was cast against the plasteline strip.

Guide marks are then scooped in a few convenient places on the plaster flange with the tip of a spoon or similar device. This flange is then soaped and oiled as before described and plaster is applied for the second half of the mold. Figure 11 shows a two-piece mold. All other operations are similar to those described for an open mold. Incidentally, shellac should never be applied to flanges or any other parts of the mold, as it seals the pores in the plaster, stops absorption of the water, and prevents building up of the latex crust.

Reproducing Fruits and Vegetables

Molds for the reproduction of fruits and vegetables are made direct from the natural products. A pouring gate is cut at the stem. For fruits and vegetables that have no stems a gate can be cut at any convenient place in the mold. The gate opening must be at least 3/8ths of an inch wide to permit draining of surplus latex. When the cast fruit or vegetable is cured, the gate hole can be plugged with scrap latex saturated in latex solution and sandpapered smooth when dry.

Figures 12 and 13 show a three-piece plaster mold and a latex cast of a pineapple. The pineapple leafs are cast separately and are bound with wire around the stalk. The wire and leaf edges are then covered by flowing latex solution over the joints. A sheet of latex for leafs and other parts that are too thin to cast may be made by flowing latex over a plaster slab. Leaf serrations can be made on the plaster with a saw blade.

When speed is desired, and when the largest possible casts from a single mold are desired, it is always advisable to make the plaster molds bulky. Painting on the surface of the latex cast can be accomplished with ordinary artist colors. No shellacking of the surface of the cast is required.

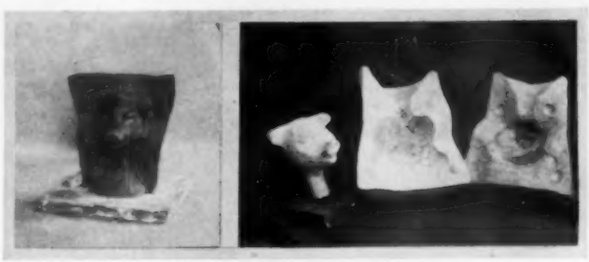
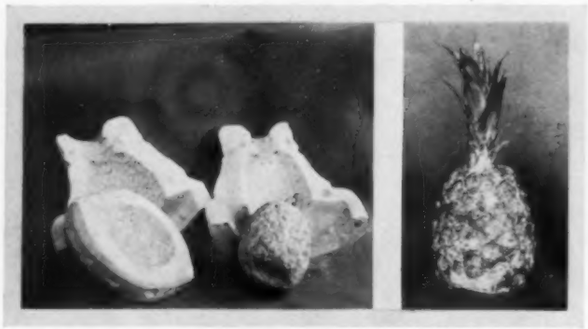


FIG. 10 (Left)—Model separated with a plasteline flange for making a two-piece mold.

FIG. 11 (Right)—Appearance of a two-piece mold.



FIGS. 12 and 13. A three-piece mold made by the method described and a latex cast of a pineapple, the leafs being cast separately and bound with wire.

EDITOR'S NOTE: The author recently developed a simple method of making as many plaster molds as desired of the same object. Briefly, it consists of a master positive latex mold in which any number of plaster negative molds can be cast. With this method, twenty or thirty or more plaster molds of the same object can be cast with latex at one time. This method will be fully described in an article on a new and improved process of making latex molds for plaster casting (the original of which was described in the October, 1937, issue of RUBBER AGE), scheduled for early publication in this journal.

Unicel - Blowing Agent for Sponge Rubber

A NEW blowing agent for sponge rubber requiring uniform cell structure has been introduced under the name of "Unicel" by the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. A diazo-amino-benzene, the new compounding ingredient is crystalline, brown in color, has a specific gravity of 1.17 and a melting point of 90° to 95° C.

Unicel is soluble in rubber to a limited extent. According to DuPont, 4.0% does not bloom when milled into rubber of medium plasticity, but 5.0% will bloom. In a sponge compound 8.0% does not bloom in the uncured state. In cured stocks very high percentages, such as 15%, do not bloom but do impart considerable color to the cured sponge.

The new blowing agent has no effect on acceleration. It does have some peptizing value, according to its manufacturer, which permits use of harder rubber than normally used with sponge. As for staining, Unicel imparts an orange color to the stock. Since it is soluble in all normally used quantities, it is said to disperse well in rubber. In use, 1.0 to 4.0% of Unicel is sufficient in soft rubber and 2.0 to 10% in hard rubber depending on the type of process used.

Use of Reclaimed Rubber In Sponge Rubber Goods

By JOHN S. PLUMB

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An interesting Symposium on Reclaimed Rubber was presented at a special meeting of the Chicago Group, Rubber Division, A.C.S., held on June 7. The uses of reclaim in tires and tubes, mechanical and hard rubber goods, and in the manufacture of sponge rubber products were discussed, each by a prominent reclaim authority. We present herewith the address on the use of reclaim in sponge rubber products, given by Mr. John S. Plumb, and expect to publish the other two papers in an early issue so that the industry may have the complete symposium available in printed form.—The Editor.

WHEN discussing the introduction of reclaims into any type of compound it must be assumed primarily that the procedure required for proper compounding of all-crude stocks in that type of compound is well understood. In some cases, the procedure applicable to crude need not be modified when reclaim is substituted, a simple readjustment of curatives being all that is required; in other cases, special methods necessitated by all-crude compounds are not demanded when reclaim is used; in still other cases, reclaim, of itself, sets up a different set of requirements. In the case of sponge it may be generally stated that no drastic changes in procedure are required, but that on the contrary certain requirements of all-crude stocks become less exacting when reclaim is used.

Fundamentals of Sponge Compounding

To consider first the fundamentals of sponge compounding, disregarding the use of reclaim, there are several important points to be considered. *First,* the compound must be extremely soft to allow the blowing agent to give off its gas and form the sponge cells with ease and rapidity. *Second,* the rate of cure must be such that the blowing agent is allowed to perform its function before the cure sets, yet the cure must begin to set immediately the cells have formed, in order to prevent escape of the gas and collapse of the cells.

The first requirement can of course be easily met in almost any compound, simply by a prolonged mastication of the rubber before compounding, and the addition of relatively large amounts of softening agents, usually mineral oils, in order to achieve a high degree of softness without inducing objectionable tack.

The second requirement, that of delayed yet rapid action of vulcanization, is not as simply met. Certain delayed action accelerators serve very well, and the amounts of them required vary with the size of cell structure, the thickness of the piece to be cured, and, of course, the amount of hydrocarbon to be vulcanized.

A third point in connection with handling sponge stocks is the aging of the mixed compound before curing. It is customary to allow a day or two to elapse between mixing and sheeting to gauge for the molds, then to allow a short period, from a matter of hours to two days, to elapse before curing. In the case of crude rubber compounds, the aging after sheeting is quite often limited. In other words, satisfactory cures may result after one day's aging, but after three days there will be difficulty in filling the mold and in obtaining a uniform and correct cell structure. This effect is probably due to the absorption of the softening oil in the rubber, so that the rubber particles, rather than being lubricated by the oil, are swelled by it and the actual plasticity of the mass is reduced to a point where plastic flow is insufficient to allow complete and uniform blowing or filling of the mold.

Effect of Reclaim on Properties

Keeping these points in mind—plasticity of the mass at mixing time and at curing time, and rate and type of cure—it becomes necessary to determine the effect of reclaim on these properties. Before discussing these effects, it is well to consider just what reasons there are for incorporating reclaims in sponge. Naturally, the economy of using reclaim comes first to mind, economy of compound cost, economy of processing cost, and economy of acceleration cost. Then the advantages of processing of reclaim compounds, ease of breaking down, sheeting or otherwise forming, the uniformity of a manufactured product in contrast to the natural material, particularly concerning curing properties, must be considered.

In sponge work, an additional advantage accrues from the use of reclaim, that is, the ability of the sheeted stock to produce a satisfactory cure for a much longer period of time after sheeting, in some cases as much as twelve days, while crude rubber compounds could not be made to cure properly more than three days after sheeting. This property alone is of great assistance to the factory man as well as the compounder.

A word about the relative stability of price of reclaim compared to crude, which applies not only to sponge compounding but to all applications of reclaim: within the past year alone, the price of crude has fluctuated as much as eight cents a pound, while reclaim prices have varied no appreciable amount in the last five years, despite crude rubber restriction, international complications, exports of scrap rubber and gov-

ernment interference with management, men and markets.

Considering now the actual mechanism of compounding with reclaim, and beginning with the matter of mastication, the procedure is generally as follows: The crude to be used should be partially broken down, perhaps for one half the time required for complete mastication to the degree desired for sponge work, the reclaim then added after a few passes simply to warm it, and the mixture further worked to the proper plasticity. It is impossible to set definite times of milling or mixing due to the varied conditions of temperature and mill speeds encountered in different plants, but it is safe to say that as a general rule the complete time of mixing and masticating both crude and reclaim will be about 20% less than for masticating crude alone. From this point on, the actual handling of reclaim stocks does not differ from crude stocks.

This leads naturally to the question of compounding reclaim. It has been found that the usual alkali type of reclaims, when used alone, tend to produce a denser and harder sponge than crude, all other factors being common, but the reclaim should be blown to a greater extent, thus overcoming this effect. Therefore, when the compounder is working to a given density, the reclaim, when blown to this degree, has a volume correspondingly high, and the volume cost of the compound does not indicate the saving. The actual difference in pound cost between the crude and reclaim stocks is the saving, since the finished sponge is made to a given density.

Selection of Acceleration

In the selection of acceleration, the characteristics of the reclaim must be taken into consideration. If an alkali reclaim is directly substituted for crude and no corrections are made in curatives, the accelerating effect of the reclaim will undoubtedly cause the stock to set before completely filling the mold and welding together. This can be overcome by reducing the amount of accelerator and by the addition of retarders of an acidic nature. Usually from .5 to .75% accelerator on the combined hydrocarbon of rubber and reclaim is a good starting point, and it will generally require close to 3% sulphur.

Retarders are not always indicated, unless there are intricate molding problems and thick pieces to form. In this case, for good filling at low densities, it is frequently necessary to hold back the cure until the mold has completely filled.

As to blowing agents, the most powerful are indicated in almost all cases. Ordinary sodium bicarbonate, ammonium carbonate or aluminum sulphate is satisfactory. Alcohol has been used in conjunction with bicarbonates, and also glacial acetic acid, although it is doubtful if any alcohol remains in the mix and the acetic acid has no particular blowing action but acts more as a retarder. The alum of course should be crystalline, containing water of crystallization.

Whatever loading materials are used have practically no bearing on the reclaim stocks, at least to no greater extent than with crude. The plasticizing and softening agents must be non-tack forming, due to the very large amounts required. Reclaim stocks will not carry quite as much oil as crude, but will take a longer period to soak up the oil and swell, after mixing, hence the observations above that reclaim stocks retain their curing ability for longer periods of aging.

As mentioned previously, reclaim makes a harder sponge, and should be blown to a greater degree, so that the feel of the finished sponge remains the same, as does the density, due to the more pronounced blowing. For this reason, a great variety of goods can be prepared, the variations of hardness and degree of blowing being regulated by the amount and selection of reclaim. For example, a very dense fine grained structure can be produced using 100% of inner tube reclaim; an automotive arm rest, density as low as .14 oz. per cubic inch, with a very soft large celled structure, using anywhere from 20 to 50% reclaim.

Advantages of Reclaim

The advantages of reclaim can be summarized as: (1) Economy, (2) Flexibility of processing, (3) Variability of finished product characteristics. In the field of economy, the actual replacement of crude is possible in high percentages, reclaim is more stable in price than crude, and the use of reclaim reduces mixing cost.

As to flexibility of processing, besides being more easily masticated, and able to withstand over-milling or under-milling after the first few minutes of breakdown, reclaim sponge stocks will cure properly up to 12 days after sheeting, whereas crude stocks will not.

Any variation of density, hardness or degree of blowing can be obtained with reclaims by varying the amount and type of reclaim without altering the remainder of the compound except to adjust curatives to the changes in hydrocarbon content.

The reclaims used in sponge vary all the way from high-grade inner tube stocks to third-grade tire stocks. The reclaim to be used depends upon the finished quality required, almost exactly in the same manner as it does with any other type of compound. For cheap, close-grained, hard sponges, such as concrete expansion joints, a third-grade tire stock can be used with little or no crude arm rests can be made with inner tube stocks forming half the hydrocarbon; while small mechanical parts have been made with 100% tube reclaims, as well as with carcass or whole tire stocks.

A simplified flow meter, operating on an exclusive, free-floating moving container principle, for the accurate metering of steam, water, air or gas, has been placed on the market by the American District Steam Co., North Tonawanda, N. Y. Known as the **Adsco Flow Meter,** it operates in conjunction with an orifice plate in the pipe line and records the flow on a large, evenly-divided chart.

A new **Electric Stop-Watch,** called "Time-It", run by a synchronous electric motor whose speed is precisely controlled by a power-house master clock which governs the cycle constancy of alternating current, has been made available by the Precision Scientific Co., 1751 N. Springfield Ave., Chicago, Ill. It has direct reading counter. Time intervals up to 2 hours 46 minutes, equal to approximately 10,000 seconds, can be read directly to 1/10 of a second.

Advances in Latex Technology

By ROYCE J. NOBLE

Consulting Technologist and Author of "Latex in Industry"

Part IV—Conclusion

APPLICATIONS (Continued)

Paper; Artificial Leather

The principal methods for treating paper or paper fibers with latex have as their object the manufacture of leather-like products. The methods employed may be classified as either saturation *(121)* or beater processes *(122)*. In the first method a porous, fibrous sheet is impregnated in a bath of latex, and in the second the loose fibers are treated in the beater (or stock chest) with latex, which is subsequently coagulated on the individual fibers and serves to bind them together as a tough, flexible sheet. It is the usual practice to thinly coat the latex-bonded artificial leather with lacquer before embossing. The production of artificial leather from saturated fabrics has been described by Stern and Malden *(123)*.

A latex-saturated paper base is fast replacing leather in certain types of shoe manufacture. Normal preserved latex is used to saturate a paper of suitable construction, the excess being removed by squeeze rolls. Various types of paper treated in this way are suitable for use as insoles, midsoles and sock linings. In the case of midsoles the paper is plied to obtain any desired thickness. After drying it is calendered to produce a characteristic leathery surface and to regulate the final thickness of the product. The rubber gives the necessary strength and softness, at the same time permitting the desired porosity to enable "breathing."

A new type of latex-paper product has recently been developed in Norway *(124)* and consists of a composite sheet made from creped kraft paper and a latex composition. It combines high physical strength and flexibility with resistance to moisture, and is particularly useful as a backing material for products requiring protection from moisture or dust during shipment. It may also be used for backing rubber if the inner surface of the paper is given a coating of some dusting material.

There is considerable activity at present in the manufacture of various types of paperboard, such as is used for insole board in shoe-making. The usual procedure in making paperboard is to add the latex in a very dilute form to the stock chest. After the rubber is deposited upon the fibers, the stock goes to the wet machine where a sheet of the desired thickness is built up on the screen. The general procedure is somewhat as follows:

A furnish consisting chiefly of kraft fiber is beaten for a period of 3 to 4 hours during which time size, fillers and other materials may be added. Upon discharge from the beater the stock may or may not go through the Jordan, depending upon the fiber used and the character of the sheet required. The fiber then passes to the chest, at which time it is diluted and mixed with latex in sufficient quantity to give 10% to 15% rubber calculated on dry weights. When the latex is thus mixed with the fiber, which has a pH of 3.8 to 4, it is flocculated and the rubber particles become attached to the fibers. Considerable care must be taken at this point to avoid subsequent difficulties in clogging of the wet machine felts.

Efforts have been made to produce artificial products similar to paper, to be used as leather substitutes or other similar purposes, by the treatment of other fibers, such as asbestos, leather and the like. The principal difficulty in a process of this kind arises from the strong coagulative effect of the leather and asbestos fibers. Suitable stabilization will overcome this difficulty as well as minimize differences between dif-

Mixing bowl for aerating latex for manufacture of Airtex cushioning products.

Pouring aerated latex into curing mold prior to vulcanizing at the Firestone plant.

ferent types of fibers, so that the pulp can be handled in the usual paper machine. The amount of rubber used will vary from about 10% in light leather to 20% or more in the manufacture of thick leathery soles. The tensile strength of such products is less than that of natural leather, but the abrasion resistance is satisfactory.

A new artificial leather utilizes leather trimmings which are reduced to fibers *(125)* and the tanning materials removed; the fibers are then treated with latex to produce a sheeted material having nearly all the qualities of leather. In another method of forming an artificial leather from leather fibers, accurate control of pH conditions is necessary to form a satisfactory sheet in the presence of salts of a polyvalent metal *(126)*. Munzinger has suggested the use of acrylic ester resins and polyvinyl acetate with latex in the treatment of leather fibers *(127)*.

Thread

The three principal processes now in commercial production for making latex thread are extrusion, use of a grooved wheel or roll, and deposition on a traveling band. By the first two methods, threads of both round and irregular cross section may be obtained; in the third method the dried latex deposit is twisted to give a round thread. In all methods the equipment may be run continuously.

The finished thread is carefully controlled as to physical properties. The tensile strength should be 3000 lbs./sq. in. or more and the modulus and permanent set must be low. Elongation up to 900% is usual. As regards weight, the lighter threads run from ten to twelve thousand yards per pound.

Numerous modifications of the above mentioned processes have been developed. Instead of extruding latex directly into coagulant, the coagulant may be streamed through latex to form a hollow thread *(128)*. The coagulant may also be forced through the porous walls of the extruding nozzle *(129)*. Extrusion into a solvent produces a fluted thread. Composite threads are formed by twisting together several threads before complete drying has taken place.

A new type of rubber thread has recently been manufactured by an English concern and possesses some unusual properties as a result of blending viscose with the latex. Its elasticity can be controlled to meet the requirements of the fabric in which it is used. It is said to possess a high resistance to deterioration and exposure to washing and may be produced in fine counts.

The new German rubber thread (Statex) is made by coating a central core of natural or synthetic fiber with rubber. After vulcanization the core is removed by a solvent which does not attack the rubber. If the core is of cellulose acetate, methyl alcohol and methylene chloride may be used as the solvent. Alternatively, the fibrous core is destroyed by the heat of vulcanization *(130)*.

Control of the thread as regards stiffness and limit of stretch has received much attention. Both properties are effected where materials such as glue, methyl cellulose and viscose are incorporated in the latex compound *(131)*. A fibrous core has been used as a temporary control of stretch *(132)*.

One of the most recent applications of elastic fabrics made from latex thread is in shoe-making. Methods have been developed for satisfactorily lasting the fabric in combination with leather uppers, thus making possible a degree of fit and comfort that cannot be obtained with other materials alone. A combination of pleated leather backed with elastic fabric is also being used as a goring. Numerous methods of forming elastic fabrics have been described.

Adhesives

One of the largest present day uses of latex is as an adhesive, not only in shoe manufacture, but for many other purposes. Some of the applications of latex adhesives in the shoe industry have been reviewed by Bradley *(133)*. Latex is generally recommended for folding cements, showing less tendency to stain than some of the solvent cements formerly used; it is also employed in cementing on soles, as a channel cement, for cementing the liner to the counter and the counter to the outer leather, and for cementing sock linings. For bookbinding, tabbing and similar purposes, it is used in place of glue and pastes.

Because of the very wide use of latex in all types of adhesives, some work has been done toward improving its characteristics for this purpose. If latex is treated with a peroxide a product is obtained which has improved adhesive properties. In present day practice solvents are used to some extent in latex adhesives. The effect of solvents in actually swelling the latex has been studied by Evers *(134)*.

Halogen Derivatives of Rubber

Although previous investigators have reacted latex with halogen in solvent and with hypochlorous acid, Baker has recently obtained some rather interesting products by the treatment of latex with an excess of hydrochloric acid in the presence of an oxidizing agent. By controlling the temperature of the reaction he obtained products containing up to 55% chlorine

which were soluble in a wide range of solvents, including vegetable oils. Although films of chlorinated products adhere firmly to glass and metal surfaces, they are somewhat brittle *(135)*.

It was found that the partially halogenated rubbers could be vulcanized. The rate of cure increased somewhat with increasing chlorine content and vulcanization could be effected in the presence of metallic oxides. Hard rubber products were found to be brittle but with a higher plastic yield point than similar products from crepe rubber.

Sponge Rubber

One of the most recent commercial developments in latex applications is the use of latex sponge rubber in constructing automobile cushions. Adoption of this material began in the 1939 models when at least two manufacturers used either sponge pads over a spring construction or fully molded sponge seats. In the 1940 models, the use of latex sponge is widespread, some 19 different makes of cars being equipped with this type of cushioning in some or all models.

Because of the structure of latex sponge articles, resulting from the method of manufacture, the air cells are for the most part intercommunicating, so that there is movement of air through the cushion as it is compressed and released during use. Further, the surface of the cushion is sufficiently porous for air to readily pass in and out, effecting cooling and ventilation.

Other advantages of latex sponge in cushions arise from simplicity of construction of the finished seat, particularly in the case of fully molded cushions, and from the fact that the material is vermin-proof. These properties, together with the increased comfort, will contribute to an increasing use, not only in automobile upholstery, but for mattresses, train seats and furniture.

The first commercial production of latex sponge in this country began in a limited way about four years ago. The first applications were for the manufacture of cushions for public service equipment. For the most part these were cushions of full size, although they were not molded in one piece in general practice. Today installations include not only seat cushions, but backs, head rests, arm rests and mattresses, and are usually molded in one piece. Equipment for trucks, tractors and other heavy equipment has since become quite general. In aircraft installation the object has been to provide sufficient cushioning and at the same time retain minimum weight.

Battery Separators

Battery separators, used to separate the positive and negative plates of a storage battery, are now manufactured from latex on a commercial scale. A microporous ebonite product is obtained by adding a high percentage of sulfur to latex, coagulating the composition in thin sheets of pre-determined cross section and vulcanizing under conditions such that the serum is retained in the coagulum during vulcanization. If desired, reinforcing means, such as fibers of fabric, may be used in the vulcanized sheet.

Separators prepared from latex have numerous advantages over wood and other materials formerly used for the purpose. They offer lower electrical resistance, do not soften or swell, and have a much higher service life *(136)*.

Upholstery

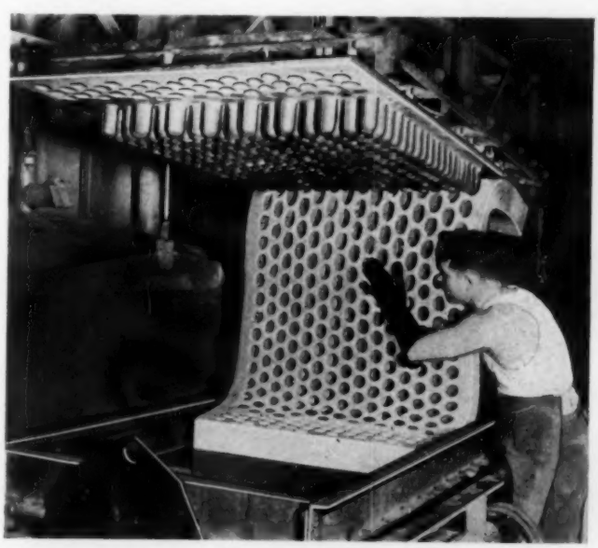
Rubberized hair is being manufactured by several concerns in this country and is being widely used in household furniture, mattresses and in seat cushions for cars and busses. The process of manufacture consists in dipping ordinary curled hair in a bath of compounded latex and then vulcanizing the rubber. The hair so treated may be formed into loops or merely left in a loosely curled condition. By proper compounding of the latex and treatment of the rubberized hair, odor may be almost completely eliminated.

The rubberized hair is, of course, more costly than the ordinary curled hair. It is, however, more durable and much more effective as a cushioning material. It is not subject to rapid deterioration. In tests, it has been found to stand up for a period in excess of 10 years without appreciable decrease in strength or elasticity.

There has recently been developed a new type of material for use in furniture, automobile and theatre seats as well as other types of upholstery *(137)*. This product consists of hair cloth, each strand of which is coated with a latex compound. The cloth itself is so fabricated as to form loops in the shape of a figure eight. It is applied in two layers of loops over a burlap spring covering and is in turn covered in the usual manner. This type of upholstery construction is such as to permit ventilation and at the same time utilize to the utmost the natural resiliency of both hair and latex. A similar construction of hair loops has been used in the manufacture of mattresses.

Latex-Coated Containers

A latex-coated fiber shipping container has recently been put on the market. It is made with a solid, seamless fiber body, the interior of which is coated with a vulcanized latex composition. The latex is



Appearance of the finished Airtex mattress and method of removal from the mold is seen here.

so applied as to form a seamless coating which makes the container air-tight. The coating adheres firmly to the side of the drum and is not easily detached. The cover of the container may likewise be covered with latex or other resistant material. The containers are suitable for solids and semi-liquid materials.

Tanning Leather

Bleyenheuft *(138)* has investigated the possibility of tannage of leather by means of latex. He has found that leather which has previously been dehydrated by means of mineral salts, such as potassium carbonate, may be immersed in latex containing a wetting agent, such as sulfonated fish oils, and that after 24 hours the skin is thoroughly impregnated with the latex. The soaked skin is dipped in a solution of oxalic acid and dried. A supple, resistant leather is obtained which may then be dyed in the usual manner.

Lubricants

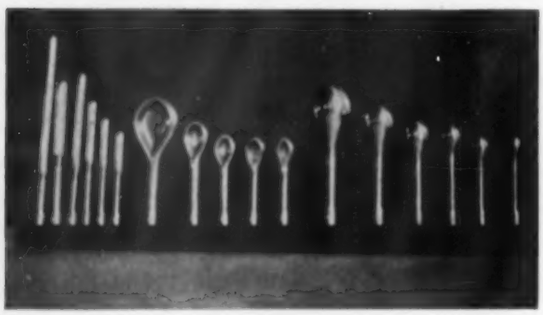
It is well known that the addition of rubber to lubricating oils greatly increases its viscosity. This matter has been the subject of study by Stevens and Donald, and Asprey *(139)*. It has been found that the addition of rubber up to about 2% on the weight of the lubricant serves to increase the viscosity in the desired manner over a wide range of temperatures. It does not unduly increase the viscosity in the cold, but does impart an improved degree of resistance of the oil to heat.

Coated Canvas Gloves

For use on rough work or handling corrosive materials, canvas gloves coated with a latex composition *(140)* have found general application. The glove is made of heavy cotton twill with a knitted wrist. It is placed on a collapsible form and dipped in a suitable latex composition up to the wrist portion. Upon drying and vulcanizing, an article is obtained which has a long service life in the roughest kind of use.

Envelope Seals

The manufacture of self-sealing envelopes has recently assumed considerable proportions. The use of latex for this purpose involves a new type of envelope construction, such that two areas may be coated with latex and so folded that they do not come in contact with each other until desired. When these two areas are firmly pressed together, a tight seal is obtained which may not be broken without tearing the paper.



Airship, paddle and round balloon aluminum dip forms made by Akron Presform Mold Co.

Anti-Percussion Latex Films

Since the beginning of the European war, latex has been widely used in England as a coating for window glass to prevent shattering during aerial attacks. Spray coats up to about 0.01 inch are applied, equivalent to coverage of 100 to 200 square feet per gallon of latex paint of 50% to 52% solids. Both colored and translucent latex paints are used and have proven as effective as wire-reinforced glass. The latex is so compounded as to resist the effects of light, heat and oxygen *(141)*.

Insulation (Purified Rubber)

There is very considerable interest at present in the use of purified or deproteinized rubber in insulation. At least two large companies in the United States are actively engaged in manufacturing this type of insulation. The rubber is applied to the conductor in the form of purified latex and its use results in a number of advantages, aside from its high insulation value, among which may be cited thinner walls for the same degree of insulation, the use of less compound, reduction in weight of the finished article and a reduced cost in braiding *(142)*.

A number of methods already referred to are available for effecting the degree of purification necessary, but the most widely employed method is that of repeated creaming or centrifuging of the natural latex. By such treatment the nitrogen content is decreased from .7 to .1% and the water absorption from 13.5 to 1.8 milligrams per square centimeter after 100 hours immersion. Other characteristics of the rubber are similarly improved by this treatment.

Road Expansion Joints

Experimentation with latex compositions for road expansion joints has been carried on for a number of years, but it is only recently that really satisfactory materials have been developed. Because of the expansion and contraction of concrete slabs used in road construction with heat and cold, and in wet and dry weather, it is necessary to use some material in the joints to maintain a smooth surface. Asphaltic cements originally used for this purpose have proved quite unsatisfactory because of their tendency to creep out of the joint in wet weather and to become brittle and break in cold weather.

Several types of joint compositions have been developed, some of which have been found very effective in eliminating both discomfort to drivers and the destruction of the road itself. The specifications involved as a result of this work call for a material which shall consist of "a liquid rubber compound (used with or without a primer) which will easily pour into an open concrete joint." The material must also set sufficiently in one hour to prevent infiltration of water or other materials and must solidify within 24 hours, adhering firmly to the concrete. It must not show disintegration through wearing.

One method said to be completely satisfactory, comprises inserting a pre-molded strip in the joint and over this is applied a pasty latex composition containing cork or other filler. While the initial cost of latex

joints of this type is considerably higher than those of asphalt, the maintenance cost is much less, and considering the savings on road maintenance the final cost of the latex compositions represents considerable savings.

In another type of joint found particularly effective between bridge piers and retaining walls, strips of sponge rubber having a thickness of ¾ to 1 inch are inserted in the road joints. This thickness of sponge allows for approximately 50% expansion or contraction so that at all times the joint is filled.

Cement-Latex Compositions; Flooring

Although the development of applications for cement-latex compositions has proceeded much more slowly in this country than in England, there are a few manufacturers of plastic flooring of this type. Whether the composition is to be used for flooring, tiles, or, as has been the subject of research by the Rubber Growers' Association, for surfacing of roads *(143)*, the precautions to be observed in compounding and application are many.

In compounding latex with aluminous cement, it has been found necessary to use a stabilizer to prevent rapid coagulation. It is important, however, that the stabilizer be one that does not retard hardening of the cement; gum acacia, soaps and caustic potash have been found suitable, although many others may be used according to the effect desired.

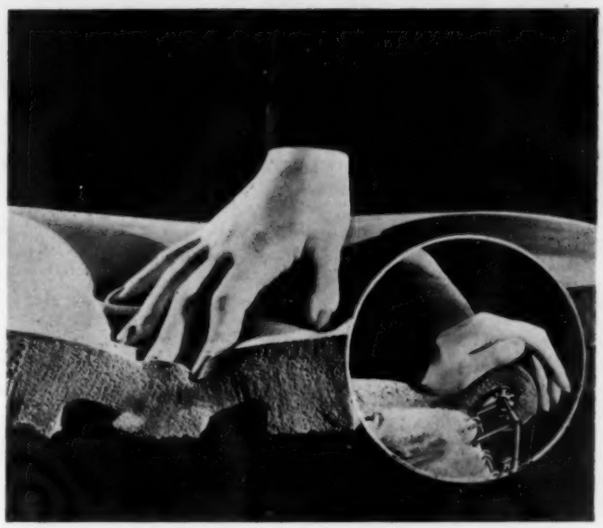
As an alternative to using the cement-latex mixture in liquid or paste form, the composition may be reduced to a crumb, which may be consolidated under pressure. Preliminary tests indicate that the surface thus formed is stronger and more elastic than when laid by the more conventional method. However, its cost is a serious factor, restricting its use in roadways generally.

Cement-latex mixtures have been found to be good adhesives for glass, tiles, bricks, etc., but not suitable for all purposes demanding the highest degree of bond. Another interesting application of this composition is in ship construction, as an underflooring for ships' decks and as an aid in streamlining the hull, both of which were done on the "Queen Mary."

Food-Wraps

One of the most interesting recent applications for latex is its use in the food-wrapping field. The Cryo-Vac method, as developed by Dewey and Almy Chemical Company, is a process for wrapping meats of all kinds in latex rubber *(144)*. Since the rubber film used is odorless and tasteless and resistant to moisture and vapor, it offers many advantages to meat packers.

Essentially, the process consists of enclosing the meat in a rubber balloon of staple size. The balloon is formed directly from latex and stretched over a frame or can of suitable size. By applying a vacuum to the outside of the balloon, it is forced to take the shape of the container. The meat is then placed in the expanded balloon and, by means of a vacuum hose, the air inside is removed, drawing the rubber wrapper in close contact with the meat. The open end is then closed to form a vacuum pack. By immersing the completed package in warm water, the rubber is caused to further shrink, forming a tight, transparent wrapping.



This piece of Goodyear's Airfoam is typical of the type used for seat cushions in automobiles.

The complete elimination of air and moisture are the principal advantages of the Cryo-Vac process. Rancidity is prevented and since there is no loss of moisture the original weight of the meat remains constant. The process is intended for rapidly frozen foods and may be used with any type of freezing method. The process may be used either for consumer packages or for larger quantities of meat intended for storage. In the latter case the bags may be removed when desired, washed and used again.

In a somewhat similar process, apples and other fruits have been coated with latex to provide a protective coating during transit. Latex is so applied that the dried film may readily be removed, leaving the fruit in a clean, sound condition.

BIBLIOGRAPHY

(121) Miedel, *India-Rubber Journal*, **91**, 375 (1936).
(122) Stern, *Rubber Age (London)*, **20**, 55 (1939).
(123) Stern and Malden, *Rubber Age (London)*, **19**, 297 (1938).
(124) *Rubber Age (N. Y.)*, **39**, 215 (1936).
(125) Stern and Malden, *Rubber Age (London)*, **19**, 297, 305 (1938); **20**, 55 (1939).
(126) Cable, U. S. P. 2,112,517.
(127) Munzinger, *Nitrocellulose*, **8**, 181 (1937).
(128) B. P. 478,903 (1937).
(129) Ziegner, *Kautschuk*, **14**, 55 (1938).
(130) B. P. 436,674 (1935).
(131) B. P. 447,972 (1936); 448,098 (1936); 449,462 (1936).
(132) B. P. 444,726 (1936); 447,227 (1936).
(133) Bradley, *India-Rubber Journal*, **90**, 387 (1936).
(134) Evers, *Rubber Chem. & Tech.*, **8**, 477 (1935).
(135) Baker, *Rubber Chem. & Tech.*, **12**, 545 (1939).
(136) Greenup, *Ind. Eng. Chem.*, **29**, 192 (1937).
(137) *Rubber Age (N. Y.)*, **38**, 276 (1936); U. S. P. 2,160,616.
(138) *Rubber Age (London)*, **17**, 120 (1936).
(139) Asprey, B. P. 449,779 (1936).
(140) U. S. P. 2,060,961; 2,120,722.
(141) Mabb, *Rubber Age (N. Y.)*, **45**, 229 (1940).
(142) Benz, *Rubber Age (N. Y.)*, **45**, 22 (1939).
(143) Wren and Faircloth, *Bull. Rubber Growers Assoc.*, **18**, 337 (1936); Roberts, *Trans. Inst. Rubber Ind.*, **13**, 476 (1938).
(144) *Rubber Age (N. Y.)*, **45**, 25 (1939).

Fighting Fire in the Rubber Factory with Carbon Dioxide

By P. W. EBERHARDT
Walter Kidde & Co., Inc.

"CARBON dioxide extinguishing has materially cut our fire losses, and greatly reduced the clean-up time and labor which was previously necessary with other extinguishing agents", is the way the Fire Chief of one large rubber goods plant sums up the case for carbon dioxide fire-fighting. This particular plant produces rubber footwear and miscellaneous rubber goods but the fire protection problems are typical of much of the industry.

Carbon dioxide fire extinguishing, both of the built-in and portable type, has had a long record of successful use for industrial fire hazards, particularly those involving flammable liquids and electrical equipment. Few industries have hazards which lend themselves so perfectly to this gas method of smothering fire because rubber plant processes—compounding, mixing, varnishing, coating, spreading and drying—involve flammable liquids which can not be as readily extinguished by other methods. Also it is essential that the extinguishing methods be as dry and clean as possible to prevent spoilage of large quantities of material.

Essentially, carbon dioxide fire extinguishing is based on the principle of diluting the oxygen content of air in a room, a container, or over a surface to a point where it will not support combustion. In the case of gasoline, for example, it is only necessary to reduce the oxygen content of the air from the normal 21% to approximately 16%, at which point flames instantly die. This dilution is accomplished by rapid discharge of the gas (stored under 800 to 1,000 pounds per square inch pressure in steel cylinders) into the enclosure or onto the surface where the fire is burning.

One of the principle advantages of carbon dioxide extinguishing is the ability of gas to penetrate every crevice of a machine or room. The gas is delivered

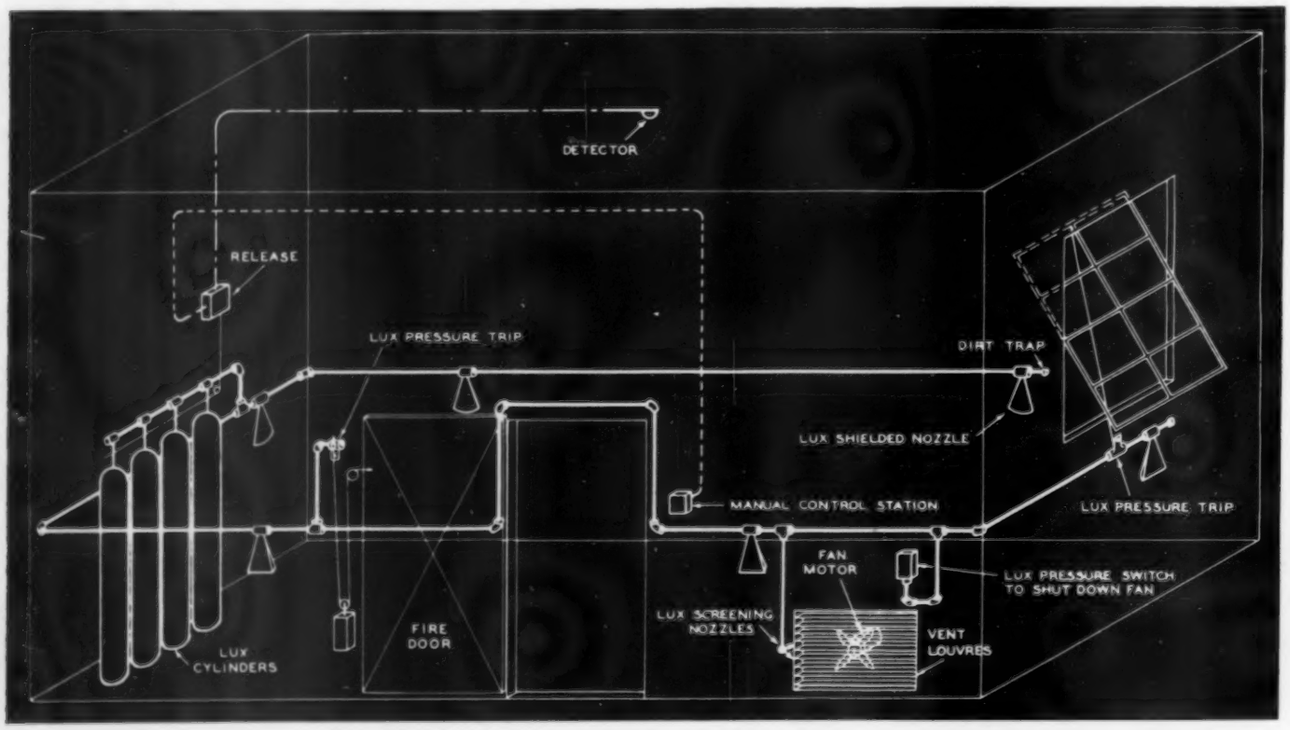


Diagram of a typical "Total Flooding" system installation, with a "rate-of-temperature-rise" detector and actuator to open the cylinder valves, close fire-doors and windows, and screen ventilation openings with a discharge of carbon dioxide.

This varnish cooking room of a large rubber goods plant is protected by a three-cylinder carbon dioxide system. Note the discharge horns.

rapidly under its own stored pressure and, being slightly heavier than air, quickly lays down a dense blanket over the burning surface. This quality makes it ideal for extinguishing fires in complicated processing apparatus such as is widely used in rubber manufacturing.

In the class of fixed systems, there are two types of application which are used in the rubber industry. The first is known as a "Total Flooding" system, wherein the process or storage room is flooded with a discharge of gas in order to bring the oxygen content of the entire room below the combustion point. Excessive escape of the gas from the room can be prevented by automatically closing fire doors and windows. Where such operation is not practical, extra gas is employed through specially designed nozzles to screen the openings and dilute any air that may enter. This method is commonly used in mixing rooms, varnish storage rooms and varnish cooking rooms.

Amount of Gas Required

The amount of gas required for flooding the average process room can be determined from the following table set up by the National Fire Protection Association:

Up to 1,600 cu. ft. of space—16 cu. ft. per pound of gas.
Up to 4,500 cu. ft. of space—18 cu. ft. per pound of gas.
Up to 50,000 cu. ft. of space—20 cu. ft. per pound of gas.
Over 50,000 cu. ft. of space—22 cu. ft. per pound of gas.

The other type of fixed system is called "Local Application", and it is commonly used on processes where discharge of the gas on a burning surface will extinguish the fire without necessity of flooding the entire room. In this category are processes involving calenders, dip tanks, drainboards and rubber-spreading machines. Usually shielded discharge nozzles are directed to the point where fire may occur, and within a few seconds after it does break out, clouds of gas billow from the nozzles on the burning surfaces diluting the oxygen content of the air directly around and above the burning surface. This protection is particularly valuable where there are obstructions around the burning surfaces, as in the case of a dipping tank where the racks and parts would interfere with application of liquid extinguishing streams. The gas penetrates past such obstructions easily and quickly covers the surface of the tank or drainboard.

A third method of applying carbon dioxide gas is through the use of portable units. These extinguishers consist of the same type of steel pressure cylinders ranging in size from a foot-high two-pound capacity unit which is ideal for laboratory and other small fires, to a 100-pound capacity unit on wheels which can completely flood a small room or lay a blanket over a good-sized spill fire. In between these two extremes are a number of intermediate models which are designed to cope with a wide variety of industrial fires in liquids and electrical equipment. All are equipped with cone-shaped discharge nozzles and hoses which permit gas blankets to be directed quickly to any part of a fire, whether it is a running fire burning from a leaking or overflowing kettle or transformer, or whether it is confined to a drum or tank.

Typical Case History

To give safety engineers an idea how major hazards in rubber plants are protected with carbon dioxide extinguishing systems, let us take a typical case history. This particular plant produces miscellaneous rubber goods, and until the installation of carbon dioxide equipment and portables it had many flammable liquid fires. In addition to causing serious material and time losses, the fires had bothered the management because of panic and liability hazards, since most of them occurred in rooms full of girl workers.

The first system in this plant was installed for protection of the cement house, and was a "Total Flooding" type. This building, which contained a number of large cement churns and also a group of pony churns, had a serious hazard involving the benzine solvent used in the rubber cement. Causes of most of the fires had been from the mixing and handling operations and from the workmen themselves.

The carbon dioxide system consisted of eleven 50-pound capacity cylinders manifolded for simultaneous discharge through a simplified piping system terminating in shielded nozzles located at vantage points around the room. Automatic operation employed the "rate-of-temperature-rise" release. Two heat actuators on the ceiling above the churns are connected by small bore

The technique of smothering fire with carbon dioxide is shown in this illustration.

tubing to release mechanisms at the cylinders. When the temperature rise exceeds 10°F. in 30 seconds, pressure is built up on a diaphragm whose movement causes release of cylinder valves. Normal temperature rises from weather or heating changes are discounted by an escapement vent but operation occurs in the first few seconds when fire breaks out. Auxiliary manual control is also provided.

The second installation was also a "Total Flooding" System for the protection of the varnish storage room. Because of the gasoline or benzine thinner used in the varnish there was a constant fire hazard, and similarly "rate-of-temperature-rise" detection was installed to release the contents of five 50-pound carbon dioxide cylinders.

The next system, also of the "Total Flooding" type, was used to extinguish fires in the varnish cooking room where varnish kettles had boiled over and resulted in serious spreading fires. Three 50-pound cylinders were adequate for this small room. This varnish kettle is wheeled outside for cooling and thinning so the system was supplemented with a 75-pound portable carbon dioxide extinguisher which can be taken out in the yard if fire occurs during the thinning operation, or can also be used indoors to supplement the built-in system.

In this same plant another system of a different type was installed to protect a large combination calender and rubber spreader. This was a "Local Application" type of system with the piping arranged to protect the cylinder and rubber-spreader as well as the drying oven. The machine itself is 20 feet long and located in a large room where "Total Flooding" was impossible. Prior to the installation of the carbon dioxide system the employees had experienced much difficulty in controlling fires in this machine, but since the carbon dioxide system was installed the two fires which did occur were completely extinguished within a few seconds—with no damage whatsoever from the fire or from the extinguishing agent itself.

One more system was later installed in the same plant to protect a varnish spray tank and drainboard installation. This was a small "Local Application" type having two 50-pound capacity carbon dioxide cylinders, with the discharge nozzles directed over the spray tank and drainboard. As with all the other systems, operation of this installation was made automatic by the use of a "rate-of-temperature-rise" detector, the actuator being located above the varnish spray tank and drainboard. In all these cases of automatic control, however, supplementary manual control is located at some position remote from the hazard.

In addition to these fixed systems and the one portable unit previously mentioned, this plant has installed nearly 100 portable carbon dioxide extinguishers at various hazard points throughout their plant. Operation of the portables is extremely simple and employees have been instructed in the proper method of operation, with the result that the fires which have occurred in the last few years have been quickly extinguished by employees. Losses in material and clean-up have been virtually eliminated, for the gas and snow evaporates within a few seconds. It does not damage the work in process in any way and production can be immediately resumed.

In the above reproduction pipes may be seen leading from the carbon dioxide storage cylinders, on the left, to hazard points in various parts of the plant.

As for employee instruction, this is a very important part of any fire protection program. Every fifth industrial fire requires the aid of public fire departments, which indicates that knowledge and equipment for fighting incipient fires is not all it should be. There are many cases in the record where employees inverted water-type extinguishers so far from the seat of the blaze that they were empty before the fire was reached, and many flammable liquid fires have been spread by the use of water.

Many plants have found that it pays to run regular fire drills and demonstrations for employees. Each man or group is assigned a post and a duty, and the operation of sprinkler and carbon dioxide systems and first aid is thoroughly rehearsed. Also, test fires are built on the plant grounds and employees are shown first hand how to select the right extinguisher and how to operate it most efficiently. Only by facing a hot gasoline or oil blaze and knocking it down with an extinguisher can employees learn to think clearly in an emergency and avoid panic and bungling.

Rubber-Like Material from Wax

A NEW so-called artificial rubber, which requires as a raw material only such mineral waxes as paraffin wax, has been developed in England. The feature of the new material is said to be the simplicity of its manufacture, which contrasts with the costly processing called for by other rubber-like materials. The wax is put into a special container where it is maintained at a temperature of approximately 400°F. A constant stream of air is circulated through the liquid wax, while peroxide of hydrogen is added to the mix. After a few hours of such treatment the wax turns into a rubber-like material which is not only elastic but which offers decided resistance to oils and greases and other substances generally injurious to crude rubber. Experiments with the process are said to have resulted in a material with definite commercial possibilities, although little is known of the material or the process other than the data above.

The Phenomenon of Creep and its Relation to Hardness Measurements

By S. R. WILLIAMS
Professor of Physics, Amherst College

For some time a series of articles by Professor Williams has been appearing in the magazine "Instruments," which is devoted to measurement and control processes, under the general title "Physical Processes Which Occur at the Point Where a Hardness Test Is Made." In one of the more recent installments, the author discusses "The Phenomenon of Creep and Its Relation to Hardness Measurements." He makes the claim that strains are always present in solids and as strain is released creep occurs. To prove that point, he gives the results of a creep test performed with a piece of rubber tubing. We believe the accompanying material, reprinted from the May, 1940, issue of "Instruments," will prove of interest.—The Editor.

STRAINS always seem to be present in solids and, as they release themselves, creep occurs. The presence of such strains was recently demonstrated in sawing slowly and carefully a piece of brass tubing lengthwise. After the cut had been carried about 15 cm. along the tube it was found that certain strains had been released and each half of the tube was twisted to one side from the other half. Yet this brass tube had been in the stock room at least 25 years. The strains were mechanically released and could they have been observed as the saw progressed it would doubtless have been found that the release had been a pseudo-cyclic or step-by-step release. Another indication of this strain always being present in solids is the fact that it is extremely difficult to find a piece of glass free from strains when viewed by polarized light.

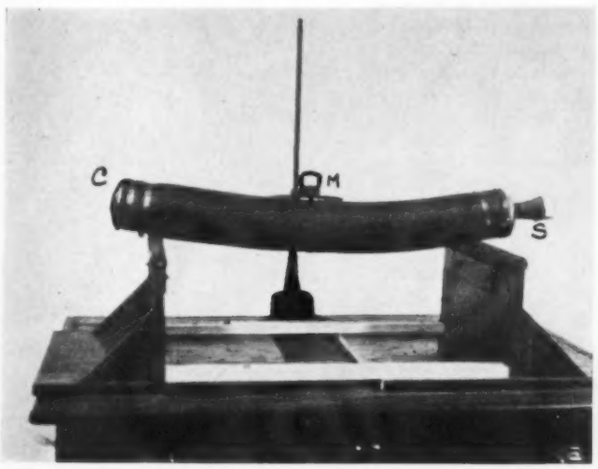


FIG. 1—A rubber tube is filled with closely packed sand whose interstices are filled with water. When the stopper "S" is closed with no air in the tube the latter becomes quasi-rigid.

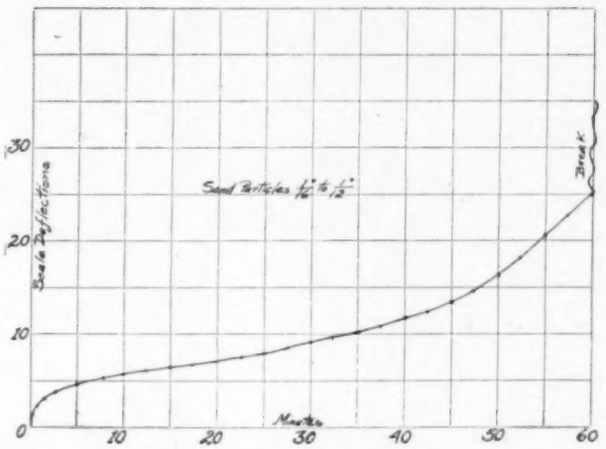


FIG. 2—The phenomenon of creep in a rubber tube closely packed with sand and water.

To throw further light on this point the following experiment was performed. It takes its origin in an amazing discovery made by Osborne Reynolds ("On an Inversion of Ideas as to the Structure of the Universe," Cambridge Press, 1903, pages 1-44) many years ago, which he calls the phenomenon of dilatancy. It may be explained simply by saying that if spheres (granulates) are arranged in normal piling the intergranular space will be a minimum. Disturb this condition and the space between the spheres or granules will be increased.

Everyone has noted this effect when walking on a sandy beach just after a wave has retreated. The grains of the sand have been left in a condition of almost normal piling and the water still fills the interstices between them. If the wet sand is disturbed by the foot intergranular space is increased and immediately the surface of the sand loses its surface wetness because the water has been pushed by atmospheric pressure into the increased intergranular space within the sand.

FIG. 3—Photographic record of the creep in a tube closely packed with sand and water.

Osborne Reynolds showed that if a rubber balloon is filled with sand and all interstices are filled with water so that no air remains in the balloon, then the balloon with its sand and water takes on peculiar properties. By removing all air and shaking the balloon into a pancake shape and then closing off the neck of the balloon, the rubber pancake became quasi-rigid. The shaking down of the sand into a lozenge-shaped piece put the sand into normal piling. On closing the rubber bag tightly, trying to change its shape increased the intergranular space and atmospheric pressure forced the rubber envelope rigidly against the sand, making the whole system of balloon, sand and water a rigid body.

Following this idea of Reynolds a piece of straight inner tubing of an automobile tire, of 10 cm. diameter, was cut into a length of 75 cm. This tube was sealed off at one end by a metal cap *C*, Fig. 1, and in the other end a similar metal cap was inserted into which the screw cap *S* of a hot-water bottle had been soldered. This screw cap made it possible to fill the mouth of the opening of the tube with water and thus eliminate all air when the plug was screwed into the opening.

When the tube, filled with sand and water, was finally sealed off it became quasi-rigid and could be laid on two roller supports as shown in Fig. 1. Due to its own weight the tube has strains set up within the sand and water, which release by slippage at the grain boundaries. The tube with sand and water shows also the creep effect like marble but it goes much faster. This is shown in Fig. 2. The size of the sand used in this experiment was such as would pass a screen of 12 mesh but would not pass one of 16 mesh.

The creep was measured by setting a tripod mirror *M*, Fig. 1, with its two rear legs on a ring stand and the front one resting on the rubber tube itself. As the center of the tube sank a spot of light, reflected from the mirror *M*, moved along a scale. The curve in Fig. 2 was obtained in this way. Much more work should be done on this phase of the work, such as effect of grain size and kindred ideas.

Fig. 3 is a photographic reproduction of the movement of the spot of light. This shows again that the process of creep goes forward by steps in a granular structure and one could in a fashion imagine these as cyclic.

Editor's Note: Professor Williams is conducting similar experiments with glass and other materials.

1939 Rubber Red Book ADDENDA and ERRATA

Page

13 American Hard Rubber Co. Interchange data under "Akron Plant" and "Butler Plant."

22 Chandler Oil Cloth & Buckram Co. Correct factory address is 241 37th St. Also change under "Brooklyn" on page 118.

28 Dispersions Process, Inc. Moved. New address is 1230 Sixth Ave. Also change under "New York" on page 120.

28 Donovan Rubber Co. Moved. New address is 28 Goodhue St., Salem, Mass. Also change from "Lynn" to "Salem" on page 115.

29 Elastic Milk Corp. Delete. Out of business. Also delete under "Milwaukee" on page 125; under "Cements" on page 74; under "Gloves" on page 79; under "Household Goods" on page 82; under "Sponge Rubber Products" on page 101; under "Stationers' Goods" on page 103; under "Toys & Novelties" on page 107; and under "Mannequins" and "Masks" on page 108.

30 Elfskin Corp. Correct address is Cherry Valley, Mass. Also change from "Worcester" on page 116 to "Cherry Valley" on page 115.

33 Fisk Rubber Corp. Dissolved. Correct title is Fisk Tire Division, United States Rubber Co. Also change title wherever incorrect elsewhere in text.

37 H. G. Rubber Co. Moved. New address is 2713 South Dearborn St. Also change under "Chicago" on page 112.

40 Houk & Co. Moved. New address is 2271 Scranton Road, Cleveland, Ohio. Also change from "Columbiana" to "Cleveland" on page 122.

43 Klingtite Products Co. Moved. New address is 5870 West 3rd St. Also change under "Hollywood" on page 110.

57 Quaker City Rubber Co. Name changed. Correct title is Quaker Rubber Corp. Also change title wherever incorrect elsewhere in text.

59 Rubber Associates, Inc. Moved. New address is 1230 Sixth Avenue. Also change under "New York" on page 120.

60 Ryan Ideal Stain & Blacking Co. Moved. New address is 29 Bennett St., West Lynn, Mass. Also change from "Lynn" to "West Lynn" on page 115.

64 Stewart's Studio. Moved. New address is 1008 George St., Lake Geneva, Wisc. Also change from "Chicago" on page 112 to "Lake Geneva" on page 125.

68 United States Rubber Co. Moved. New address is 1230 Sixth Avenue. Also change under "New York" on page 120.

72 Yellin Rubber Co. Correct address is 34-12 36th Ave. Also change under "Long Island City" on page 119.

205 Continental Machinery Co. Moved. New address is 305 Broadway.

207 Limar Corp. Delete. Out of business. Also delete under "Thread Covering Machines" on page 144.

275 Givaudan-Delawanna, Inc. Moved. New address is 330 West 42nd Street.

302 J. L. Handy & Co. Delete. Out of business.

339 George D. Kratz. Moved. New address is 200 Church St.

347 Vultex Chemical Co. Moved. New address is 200 Church St.

The new **Mercury Clutch** developed by the Mercury Clutch Corp., Massillon, Ohio, is said to permit a driving motor to gain speed before assuming load. Thus, smaller motors may be used when starting under load. At present, 4 and 4½-inch diameter sizes are standard, and will transmit loads up to 5 h.p. Other sizes can be secured on specification.

A Guide to Farm Equipment Tire Sizes

FOR several months a committee, representing the farm tractor and implement industry, and the tire industry, has been working toward the simplification of farm tire sizes. The first phase of this Agricultural Tire Simplification Committee's work has been completed successfully by the reduction from 214 to 128 in the number of farm tractor tire sizes required by tractor manufacturers, and from 118 to 73 in the number of tire sizes required by implement makers.

An official list, which shows the sizes approved by the joint Committee representing the two industries and and the number of units sold last year in each size, is being distributed to all tractor, implement and tire manufacturers with the urgent request that the engineers use this list of approved sizes in designing their tractors and implements and in selecting tire sizes for them. By means of this list the engineers will be able to pick those sizes which are already in production and to use, if possible, the items that are produced in greatest volume.

The Agricultural Tire Simplification Committee will continue to meet periodically for the twofold purpose for which it was established: (1) To eliminate other existing sizes as the need for them disappears; (2) To discourage the introduction of unnecessary new sizes which are not required by bonafide engineering considerations or other reasons. The Simplification Committee has repeatedly emphasized, however, that it will not take any steps that may retard experimentation, research, or progress in the adaptation of rubber tires to farm machinery, because it is recognized that this movement is still in its early stages and that further development can improve and perfect it.

There was urgent need for work of this nature. The use of rubber tires on farm machinery, which began only a few years ago, increased with tremendous rapidity because of certain very definite advantages: greater speed of operation, lower rolling resistance, reduction in fuel costs, saving in wear and tear on the machinery, the ability to run rubber-tired farm machinery on roads from which steel wheels with lugs would be barred, and much greater comfort to the operator. In addition, rubber tires, because they lessen the jarring and the friction to which the implements are subjected, made it possible to introduce radical improvements in their design.

But the very rapidity of the growth in the use of rubber tires caused the number of sizes to become un-

FARM TRACTOR TIRE SIZES

FOR ORIGINAL EQUIPMENT

SIZE	Ply	Description	1939 Unit Sales To Mfrs.
6-16	4	Rib	6
6-19	4	Single Rib	23,946
6-20	4	Traction	—
6-30	4	Traction	—
6-32	4	Traction	—
6-44	4	Traction	—
6-12	4	Sgle. Rib	1,678
6-40	6	Traction	—
6-44	4	Traction	—
7-32	4	Traction	10,949
7-40 Exp.	6	"	6
7-40	4	"	—
7-44	4	"	—
8-32	4	"	39,943
8-32 Exp.	6	Rc. & Cnfld.	—
8-32 Exp.	2	Traction	14
8-36	4	"	30,198
8-36	4	"	5,466
8-38	4	"	1,634
8-38	4	"	360
9-24 Exp.	2	"	106
9-24	4	"	30,110
9-30	6	"	—
9-30	6	"	200
9-30 Exp.	2	"	2
9-32	6	"	—
9-36	6	"	2,967
9-38	6	"	6,120
9-38	6	"	2,386
9-44	6	"	—
10-28	4	"	200
10-30	4	"	—
10-32	4	"	10,218
10-32	6	"	106
10-36	6	"	227
10-38	8	"	5,207
10-38	6	"	4,972
11-24	6	"	68
11-32	6	"	—
11-36	6	"	—
11-38	6	"	18,781
11-38	8	"	19
11-38	6	"	141
11-38	6	"	1,630
11-38	6	"	2,180
11-38	8	"	2,010
11-42	6	"	—
12-24	4	Traction	—
12-28	4	"	4
12-30	4	"	—
12-32	6	"	—
12-34	6	"	—
12-36	6	"	388
12-38	6	"	—
12-38	8	"	—
12-42	6	"	—
13-30	8	"	—
13-38	8	"	—
14-28	6	"	—
14-30	6	"	—
15-30	8	"	89
15-38	8	"	—
4.00-15	3	Rib	6,638
4.00-15	4	"	28,015
4.00-15	4	Sgle. Rib	78,589
4.75-15	4	"	10,870
5.00-16	4	Rib	31,560
5.00-16	4	Sgle. Rib	21,310
5.25-21	4	Rib	137
5.50-16	4	"	21,380
5.50-16	4	Sgle. Rib	78,994
5.50-16	6	"	658
5.50-16	6	Sgle. Rib	1,388
6.00-12	4	Sgle. Rib	166
6.00-16	4	Rib	30,140
6.00-16	4	Sgle. Rib	58,427
6.00-16	6	Rib	668
6.00-16	6	Sgle. Rib	280
6.00-20	6	Rib	1,710
6.00-20	6	Traction	1,374
6.00-32	4	"	3,366
6.50-15	4	Rib	30
6.50-16	4	Sgle. Rib	—
6.50-16	6	Rib	166
7.00-16	4	Traction	6,389
7.50-10	6	Rib	666
7.50-10	6	"	796
7.50-16	6	"	370
7.50-16	8	"	134
7.50-18	6	"	5,619
7.50-18	4	Sgle. Rib	1,326
7.50-19	6	Rib	78
7.50-20	4	Sgle. Rib	30
7.50-20	6	Rib	621
7.50-32	6	Traction	4,104
7.50-34 Exp.	6	"	6
7.50-34	6	"	1,419
7.50-36	6	"	211
7.50-40	6	"	53
7.50-40	6	"	30
9.00-10	4	Rib	114
9.00-10	6	"	503
9.00-24	4	Traction	1,332
9.00-24	6	"	688
9.00-32	6	"	983
9.00-36	4	Traction	23,187
9.00-36	6	"	17,309
9.00-38	6	Rc. & Cnfld.	—
9.00-40	6	Traction	8,875
9.00-40	6	"	660
10.00-36	6	"	34,170
10.00-38	6	Rc. & Cnfld.	—
10.00-40	6	Traction	8
10.00-40	6	Rc. & Cnfld.	—
10.00-44	6	"	—
11.25-24	6	Traction	12,741
11.25-24	6	"	7,835
11.25-38	6	"	1,616
11.25-38	6	"	309
11.25-38	6	Traction	11,950
11.25-38	6	Rc. & Cnfld.	—
11.25-40	6	Traction	46
11.25-40	6	"	699
12.75-24	6	"	2,052
12.75-38	6	"	2,880
12.75-38	6	Rc. & Cnfld.	—
12.75-38	6	Traction	1,733
13.50-24	6	"	634
13.50-38	6	"	2,585
13.50-38	6	Rc. & Cnfld.	—
13.50-38	6	Traction	486

Exp.—Experimental Size

This list of farm tractor tire sizes has been approved by the Agricultural Tire Simplification Committee. It will be revised every six months.

FARM IMPLEMENT TIRE SIZES

FOR ORIGINAL EQUIPMENT

SIZE	Ply	Description	1939 Unit Sales To Mfrs.
3.00-7	2	Implement	122
3.50-12	4	Rib	2,396
4.00-8	4	Implement	104
4.00-8	4	"	9,398
4.00-9	4	Single Rib	—
4.00-12	4	Implement	3,709
4.00-12	6	"	234
4.00-18	2	"	966
4.00-18	4	"	5,415
4.00-24	4	Trac. Impl.	688
4.00-32	4	Implement	983
4.00-36	4	"	134
4.00-36	4	Traction	1,109
4.00-36	6	"	208
5.00-15	4	"	3,891
5.00-15	4	Trac. Impl.	4
5.00-16	6	Implement	10,920
5.00-16	6	Trac. Impl.	—
5.00-21	4	"	6
5.00-21	4	Implement	5,536
5.00-36	4	"	99
5.00-36	6	"	53
5.00-40	4	"	73
5.00-40	6	"	52
5.50-16	4	"	4,866
5.50-28	4	Trac. Impl.	109
6.00-9	4	Implement	515
6.00-9	6	"	150
6.00-9	8	"	128
6.00-16	4	"	5,528
6.00-16	6	"	1,042
6.00-20	4	"	182
6.00-20	6	"	52
6.50-16	4	"	1,360
6.50-16	6	"	22,323
6.50-24	4	"	141
6.50-24	6	"	501
6.50-36	4	"	1,697
6.50-36	6	"	1,633
7.00-16	4	"	640
7.00-16	6	"	18,851

SIZE	Ply	Description	1939 Unit Sales To Mfrs.
7.50-10	6	Implement	2,404
7.50-16	6	"	3,904
7.50-16	8	"	1,324
7.50-18	4	"	1,311
7.50-18	4	Trac. Impl.	4,286
7.50-18	6	Implement	981
7.50-18	8	"	324
7.50-32	4	Trac. Impl.	1,081
7.50-34	4	Implement	3,955
7.50-34	4	Trac. Impl.	2,727
7.50-34	6	Implement	2,550
7.50-36	4	"	225
7.50-36	6	"	226
7.50-38	6	"	16
7.50-36	4	"	307
7.50-36	6	"	—
8.25-24	4	"	30
9.00-16	6	"	32
9.00-16	10	"	96
9.00-24	6	"	1,538
9.00-24	8	"	538
9.00-30	4	"	137
9.00-36	6	"	408
9.00-36 Exp.	10	"	—
9.00-40	8	"	427
9.00-40	10	"	—
11.25-24	6	"	1,030
11.25-24	8	"	1,160
11.25-28	6	"	78
11.25-28	8	"	69
11.25-38	10	Mod. Combns.	190
12.75-32	6	Implement	222
12.75-32	8	"	10

Exp. Experimental Size.

This is the approved list of farm implement tire sizes for original equipment. Engineers are urged to use these lists in selecting tire sizes.

economically large. For example, last year out of 214 tractor tire sizes offered to manufacturers 10 sizes, or 5 per cent of the total number of sizes, represented 37 per cent of the total units; the next 20 sizes, or 9 per cent of the total, represented 34 per cent of the units; and the rest of the sizes, 184, or 86 per cent of the total, accounted for only 29 per cent of the total units.

The use of an unnecessarily large number of sizes adds appreciably to the cost of the manufacture of tires, in mold depreciation, curing expense, machine changes, die costs; it increases the manufacturing problems of the farm tractor and implement makers and adds to the inventory burden of both implement manufacturers and dealers. Most important, perhaps, it causes inconvenience to the farmers by hampering interchangeability of wheels, by increasing obsolescence, and by making it more difficult to obtain readily the exact sizes needed for replacement.

The Charles Goodyear Lecture

THE Charles Goodyear Lecture was founded by the Division of Rubber Chemistry of the American Chemical Society during the 98th Meeting of the Society, held in Boston, Mass., the week of September 11, 1939, in commemoration of the one hundredth anniversary of the discovery of the vulcanization of rubber by Charles Goodyear. Its functioning lies in the hands of a Lecture Committee.

According to the rules concerning the award, which may be made annually at the discretion of the Lecture Committee, nominations must be in the hands of the Secretary of the Division of Rubber Chemistry by November 15 of the year preceding that in which the Lecture is to be given. Because the time between the announcement of the Lecture at Boston and November 15, 1939, was so short it was decided not to make any award for 1940.

However, nominations are now in order for the 1941 Lecture, and members of the Division of Rubber Chemistry are urged to send in their nominations to the Secretary, H. I. Cramer, c/o University of Akron, Akron, Ohio, at any time prior to November 15, 1940. So that the purpose of the Lecture, the method of nomination, and the procedure for the selection of the Lecturer may be fully understood, we are reproducing herewith the rules governing the Lecture.

Rules Governing Lecture

(1). The Charles Goodyear Lecture may be given annually, at the discretion of the Lecture Committee, for the purpose of stimulating interest in fundamental research on rubber and to recognize those who have made outstanding contributions to the science of rubber or related subjects.

(2). The Lecture shall be given before The Division at one of its regular meetings.

(3). The Lecture Committee shall be a standing committee composed of seven past chairmen of The Division who are active members of The Division.

(A). *Chairman:* The Chairman shall be the immediate past chairman of The Division.

(B). *Members:* The membership shall be selected from the next most immediate past chairmen. Each year the oldest member of the Committee in point of service as Chairman of The Division shall be retired from the Committee. The membership of the Committee is therefore constituted each year following the election of officers and Executive Committee of The Division at its fall meeting. Vacancies due to inability of persons designated to serve may be filled by the Chairman of the Committee from the list of past chairmen. If a member of the Lecture Committee is nominated for lecturer, the Secretary of the Division shall serve in his place until final selection is made.

(4). The function of the Lecture Committee is to select a Lecturer and to make the necessary arrangements for the Lecture. The Chairman of the Lecture Committee shall have the authority to deal directly with the lecturer in all matters concerning the Lecture.

(5). Nominations for the lecturer may be sent to the Secretary of The Division by any member of The Division. Nominations shall be accompanied by a statement setting forth the qualifications of the nominee, with specific reference to the research on which the nomination is based. This statement should be in the form of seven copies, for distribution to the members of the Lecture Committee. All nominations to be considered must have been received by the Secretary of The Division on or before November 15 of the year prior to the Lecture.

(6). Members of the Lecture Committee shall be uninstructed, and left solely to their own judgment in voting.

(7). (A) The Chairman of the Committee, before February 1, shall send each member a copy of these rules and a list of all candidates, and the reason for their nominations, presenting these in the form of the statements submitted by their proposers, but the names of the latter shall not be given.

(B) The Chairman shall request a letter ballot. The candidate receiving five votes shall be considered elected. In case a choice shall not have been made on the first ballot, the candidates receiving the highest two ballots shall be voted on again in a second ballot.

(8). The Lecturer shall be notified of his selection prior to March 1.

(9). The Lecturer shall be given an honorarium of $200.00 drawn by the Treasurer of The Division and presented by the Chairman ten days prior to the Lecture.

(10). The Lecturer shall also be presented with a suitably inscribed certificate stating that he was the Charles Goodyear Lecturer.

(11). The Lecture Committee shall have the power to decide any question not specifically covered by these rules.

(12). These rules may be amended by a majority vote of The Division at any meeting, provided that written notice of the proposed amendment has been sent to each member of The Division at least thirty days in advance of the meeting.

Editorials . . . . . .

Changing Picture

ALTHOUGH the first so-called synthetic rubber — buna — was discovered prior to the World War, it really had its birth as a manufacturing material during that war. In the peacetime period from 1918 to 1939 several additional synthetic rubber-like materials were born—neoprene and Thiokol in the United States, Sovprene in Russia, imitation products in Japan. Koroseal, although falling in another chemical category, might also be added to that list. Now another war witnesses the birth of two important synthetic rubber-like materials, both announced last month, Standard Oil's butyl rubber and Goodrich's Ameripol or "Liberty Rubber."

Whether the appearance of these two new products at this time was prompted by the clamor for American preparedness, or whether it was purely coincidental based on the culmination of laboratory research, is far less important than that their availability puts a new light on several important factors, primarily that the United States is now on a far better footing with respect to rubber supplies in the event that shipments of crude rubber from the Middle East should ever be seriously curtailed for any reason whatsoever.

Stronger claims have been made for both butyl rubber and Ameripol than have been made for any of the synthetic rubber-like materials heretofore available. For instance, Standard Oil claims that its butyl rubber more closely resembles the natural product in both its characteristics and performance than any of the other types now available. The point is made that unlike other synthetics butyl rubber is not an oil-resistant material but that it has "special properties of its own which make it superior to natural rubber for many uses." What these "special properties" are and to what uses they lend themselves remains to be seen.

The importance of Ameripol may be realized from the statement of John Lyon Collyer, Goodrich president, who in announcing the new material said that tires made with it will be available to the public after July 1. It is no trade secret that the volume of synthetic rubber-like materials will be paltry when compared with that of crude rubber until such time when their use in tire manufacture is a practicality. The fact that Goodrich is now making tires using Ameripol to replace natural rubber in proportions varying from 50 to 100% leads to the belief that such tires, even though they cost more at present, will give as good or better service than tires made with natural rubber.

As Mr. Collyer so aptly pointed out, if the tire manufacturing industry were to replace with Ameripol (or presumably any other synthetic rubber-like material with similar properties) the natural rubber in the tire treads and sidewalls alone, it would reduce by approximately one-half America's consumption of the natural product.

We do not subscribe to the belief that the American consumer, out of a sense of patriotism or Americanism, will rush headlong to purchase tires made with American synthetic rubber-like materials, made from American raw materials, and willingly pay a premium of approximately 25 to 50%, but the knowledge that in the event natural rubber supplies are unavailable, as they were in the early days of the World War, he is still assured of new and good tires, gives an economic assurance to this country which cannot be over-emphasized.

The appearance of the two new synthetic rubber-like materials, which we suspect are forerunners of others now in the laboratories, will have another economic effect. They, in conjunction with those now available and others soon to come, definitely place a ceiling on the price of natural rubber in this and other countries. We doubt whether crude rubber prices can ever again soar over the $1.00 level, or, for that matter, much higher than a 25-cent level.

Even should none of the present plans to build commercial plants capable of turning out tens of tons of synthetic rubber-like materials daily ever materialize, the mere fact that the plans are ready and can be placed in operation in a reasonably short span of time, will serve as an effective curb on the price of natural rubber, irrespective of its source.

CURRENT NEWS OF THE MONTH

BUTYL RUBBER AND AMERIPOL, TWO NEW SYNTHETIC RUBBERS, ARE ANNOUNCED BY STANDARD OIL OF NEW JERSEY AND GOODRICH

Claim Butyl Rubber Can Be Made by Process More Direct and Simpler Than That Used for Production of the Bunas While Ameripol Is Adaptable to Use in Tire Manufacture

ANNOUNCEMENT of two new so-called synthetic rubbers, although one was termed a "substitute" rubber, was made earlier this month. The first, made on June 4, was that of the Standard Oil Company of New Jersey, and the second, made on the following day, by the B. F. Goodrich Company. Availability of the Standard Oil product, called butyl rubber, was announced by W. S. Farish, president of the company, at the annual stockholders' meeting at Flemington, N. J., while that of Goodrich, called Ameripol, was made at impressive ceremonies in New York City.

According to Mr. Farish, butyl rubber is a companion product to the buna rubbers. Although the bunas are manufactured in Germany from limestone and coal, they will be manufactured in this country, at a plant now under construction in Baton Rouge, Louisiana, from oil. Butyl rubber, he said, will also be made from oil, but by processes more direct and simple than those required for the production of the bunas.

Butyl rubber, it was pointed out, is not an oil-resistant product and therefore will not be in direct competition with buna or any of the other so-called synthetic rubbers. However, it is said to have special properties of its own which make it superior to natural rubber for many uses. The commercial development of the new rubber, according to the Standard Oil executive, will be in stages, the first being the manufacture of relatively small quantities for the specialty market and for commercial testing in tires.

"Straight Petroleum Product"

Describing the new rubber as being "more nearly a straight petroleum product," Mr. Farish went on to say that "although its manufacture involves the most advanced technology, we have solved successfully the primary production problem." He revealed that a semi-commercial pilot plant is already in operation at the company's laboratory in Bayway, N. J., and stated that butyl rubber can be produced in any required quantities as rapidly as the necessary plant facilities can be installed.

Mr. Farish also disclosed that Standard Oil of New Jersey owns the patents for the production of both buna and butyl rubber in the United States and British and French Empires. Originally, he said, chemical developments of Standard Oil were carried on by a company owned jointly with I. G. Farbenindustries, but that last summer, to avoid difficulties, the New Jersey company acquired all the stock of the German company in the development concern. No cash payment was made, however, the German concern receiving the patent rights for the rest of the world.

Goodrich Announces Ameripol

The announcement of the second so-called synthetic rubber was made by John Lyon Collyer, president of the B. F. Goodrich Company, before a gathering of more than 500 industrialists, scientists, military experts, and members of the press, in the Empire Room of the Waldorf-Astoria. Called Ameripol, signifying a polymer of American materials, the Goodrich product, too, is made from oil.

Ameripol, according to Dr. Waldo L. Semon of the Goodrich research staff, who is credited with the discovery of Koroseal, and who described the new synthetic material at the gathering, is made from butadiene, secured from petroleum by the modern "cracking" process. The butadiene is mixed with other ingredients prepared from natural gas and air (the exact nature of which is still a carefully guarded secret of the company) and made into a milky emulsion through the use of a soap. Heating and agitation of this emulsion results in one of synthetic rubber which resembles in appearance the latex from *Hevea brasiliensis*. From this point on it is handled like natural latex, being coagulated and sheeted.

Although no specific claims were made for Ameripol by either Mr. Collyer or Dr. Semon, the basic importance of the new material to the rubber industry and to the consumer lies in the fact that it is adaptable for tire manufacture. According to Mr. Collyer, Goodrich has already begun the manufacture of tires using Ameripol, which the company also calls "Liberty Rubber" since it may free the United States from dependence on foreign sources of supply, replacing natural rubber in proportions varying from 50 to 100%. These tires will be on the market shortly after July 1.

Mr. Collyer stressed the point that if the tire industry were to replace with Ameripol the natural rubber in tire treads and sidewalls alone, it would reduce by approximately one-half America's consumption of the natural product. He stated that tires made from Ameripol will first be higher in price than those made with natural rubber, but that with increasing production economies may be expected which will reduce the price.

In connection with production of the new synthetic material, Dr. Semon revealed that based on laboratory research a pilot plant was built and has been in operation in Akron for the past year and a half. A decision was also reached to build a fully-commercial plant, the first unit of which will have a daily capacity of several tone. The unit is under construction and is expected to be ready for operation in the fall. The point was made that Ameripol was an exclusive Goodrich development and did not infringe on any existing patents.

Court Dismisses Dill Suit

The latest suit filed by the Dill Manufacturing Co., Cleveland, against William F. Goff, of Akron, to establish rights to a new type of tire valve invented by Goff while in the employ of Dill, and which is now being manufactured by the Ohio Injector Co., Wadsworth, Ohio, was dismissed in Federal Court in Cleveland on June 5 by Judge Paul Jones. The court made the observation that suits of this type should be heard in the state courts. Twice within the past year Dill has brought suit against Goff in the common pleas court in Summit County, Ohio, but each time withdrew the action. Dill not only seeks rights to the patent, but also an accounting.

PLANS ARE COMPLETED FOR MEETING OF RUBBER DIVISION

Plans for the meeting of the Rubber Division, A.C.S., scheduled to be held in Detroit on Thursday and Friday, September 12 and 13, have been completed. The program includes technical sessions, which will be held in the Commandery Asylum of the Masonic Temple; a symposium on "Rubber, Synthetics, and Plastics in the Automotive Industry as Viewed by the Engineer and the Chemist," which will be held on Thursday afternoon; and a banquet to be held at the Book-Cadillac Hotel on Thursday evening.

Convention One Hundred, as the Detroit Section of the A.C.S. has chosen to call the 100th meeting of the Society, promises to be one of the outstanding meetings of the Society. Plans for the symposium and the banquet are in the hands of the Detroit Rubber Group and information now on hand leads to the belief that several surprises are in store. Headquarters of the Division will be in the Book-Cadillac Hotel and members are urged to make early reservations.

Tentative Paper Rules

All members of the Division are invited to present papers before the technical sessions. Papers intended for presentation for the Detroit meeting will be received under two new rules adopted by the Executive Committee as tentative measures. These rules are:

(1) Submission: Each author planning to present a paper before the Division of Rubber Chemistry shall submit to the secretary not later than July 13 the title of his paper, together with three copies of an abstract of 200 to 250 words, and an estimate of the time which will be needed for presentation, together with the name of the laboratory in which the work was done. (Note: Complete manuscripts may be submitted if desired, in which case two copies must be submitted in addition to three copies of the required abstract).

(2) Approval: Each paper shall be approved by a Papers Committee, consisting of the Editor of Rubber Chemistry & Technology, the Secretary, and a member of the Executive Committee appointed by the Chairman, before the paper will be placed on the final program.

It is pointed out that inasmuch as the judgment of the Papers Committee must be based entirely upon the abstract (in those cases where complete papers are not submitted by July 13), it is important that the abstract be not only concise but comprehensive. The abstract should set forth the purpose of the work, the important results, and the conclusions. It is urged that the utmost care be exercised to make lantern slides legible through the use of large type, heavy lines and limited data.

H. I. Cramer, of the University of Akron, Akron, Ohio, is Secretary of the Rubber Division, and all papers intended for presentation at the Detroit meeting should be submitted to him promptly.

DISTRIBUTORS' STOCKS INCREASED IN QUARTER

Total distributors' stocks of tire casings are estimated at 7,549,000 on April 1, 1940, an increase of 539,000 during the first quarter, and 732,000 higher than for April 1, 1939. Higher figures were estimated for April 1 and July 1 in 1937, but not subsequently. Except for a slight decline in the third quarter of 1939, distributors' stocks have increased steadily since October, 1938. The estimates and the figures are supplied by the Leather & Rubber Division of the Department of Commerce, Washington, D. C.

The first quarter increase was greatest in stocks of chain store distributors and the larger dealers. Oil companies and small dealers showed reduced stocks in comparison with those on hand on January 1. Each group of distributors has larger stocks now than a year ago. A first quarter increase is seasonally normal, but the current increase exceeds that for the first quarter of 1939 when consumer buying was definitely increasing.

AUTOMOBILE MANUFACTURERS KEEN ON WIDE-BASE TIRES

According to rumors in automotive circles in Detroit and tire circles in Akron, the automobile manufacturers are expressing decided interest in the possible adoption of wide-base tires on 1941 models. In fact, one report has it that two manufacturers have contracted with Firestone for early delivery of the new type tires.

Approximately 1½ inches wider than tires now in popular use, the new wide-base tires, an outgrowth of similar tires used on tractors, include among their objects the achievement of greater car stability, particularly at high speeds; the gaining of additional traction and lowering skidding tendencies; the attainment of greater safety under all driving conditions; the improvement of tire appearance; and the reduction of internal stress and friction. Proponents of the tires advance many other advantages.

There are numerous reasons advanced why it would seem doubtful that any automobile manufacturer would adopt the wide-base tires for next season's crop of models, particularly the facts that for the most part the new type tires for passenger car use are still largely in the experimental stage and that there has been insufficient road-testing to date to determine such questions as stability, safety and anti-skid properties. Then, too, wheels, which would have to be heavier, would first have to be standardized.

LEFT: W. L. Semon, of Goodrich, demonstrating the manufacture of Ameripol, the new synthetic rubber-like material, to David M. Goodrich, chairman, and John L. Collyer, president of the company, at the recent "preview" held in New York. RIGHT: Ameripol sheets being washed in the semi-commercial plant at Akron. TOP: Skeleton of the new commercial plant being built in Akron, which is expected to be ready for operation in the fall with a capacity of several tons daily.

APPROPRIATION ASKED OF CONGRESS TO CONDUCT SURVEY OF RUBBER POSSIBILITIES IN LATIN AMERICAN COUNTRIES

European War Again Emphasizes the Necessity of Having a Source of Supply in the Western Hemisphere in Case Crude Rubber Shipments from the East Are Endangered

INCREASING difficulties with the shipment and receipt of crude rubber from the Far East to the United States, due to the war raging in Europe, have served once again to focus attention on Latin American countries as a source of supply. Although attention in this direction has been previously paid by the Government its efforts were for the most part lax, and other than the investigation made back in 1923 on the feasibility of establishing a commercial source of supply in tropical America little has been done. Now, however, several important voices have been raised and a $1,000,000 appropriation has been asked of Congress for an experimental program.

In a broadcast on May 12, Senator Capper, of Kansas, suggested that the United States use some of its gold to develop the rubber industry in Brazil. If either Germany or Japan tried to seize the Dutch East Indies, he said, Great Britain would undoubtedly call upon this country to send its Pacific Fleet to protect British and other interests in those islands. "We would be better off if we were getting our rubber from Brazil," said the Senator, "than to have to continue to depend on the Indies."

$1,000,000 Proposed for Survey

A few days later, on May 16, Representative Hamilton Fish, of New York, proposed that Congress appropriate $1,000,000 for a comprehensive survey of rubber production possibilities in South America by the Department of Agriculture. According to the Representative's idea, the survey would be made merely to determine the location of possible plantations and later appropriations would have to be made for acquisition of the land and operation of the plantations.

"I am informed that 20 000,000 acres are available for rubber production in South America," said Mr. Fish. "I am also informed," he continued, "that this program will have the active support of the big rubber companies." He also stated that carrying out his proposal would bring down the price of rubber.

On the same day, Loren G. Polhamus, of the Bureau of Plant Industry and Invention of the Department of Agriculture, in addressing the Eighth American Scientific Congress in Washington, urged that early steps be taken to restore rubber production to what he called its "native home," the tropical lowlands of the Americas. He said that such a development would not only make the Western Hemisphere more independent of the war-threatened Far East, but it would be good for the land and its residents.

Shortly after the proposal to place $1,000,000 at the disposal of the Department of Agriculture was made, the Department revealed that it had drawn up plans for the proposed investigation and that it was prepared to proceed at "emergency speed" in making the survey in Central and South America. The project would be completed within six months, officials said.

The Department's plan, it was revealed, calls for the establishment of at least four experimental stations to demonstrate the practicability of producing rubber in the Latin American countries. The area most suitable for rubber cultivation, it was said, extends from southern Mexico to the Amazon River in Brazil. Officials said they were confident that Central and South American governments would cooperate with the program and would furnish land and labor for the experiment stations.

It was pointed out that the Department of Agriculture could proceed immediately to the planting of rubber for the purpose of demonstrating where new high-yield strains propagated by bud grafting will grow best, using the 1923 survey as the basis for such plantings. Seedlings, it was said, could be supplied from the Government's experimental rubber plantation near Miami (a description of which appeared in the May, 1940, issue of RUBBER AGE).

Basis of the Program

The basic hope of the Department's experts is two-fold: (1) That the Latin American governments concerned will carry on the work created by the experiment stations, which would continue in operation for at least three years; and (2) That the larger rubber companies will follow through in a big way. The important portion of the Department's job, however, would be to get natives started by showing them how to cultivate good rubber.

Some experimental work, of course, has been done in the Latin American countries. Ford has been scientifically cultivating rubber in Brazil since 1928 and Goodyear has had a plantation in Costa Rica for several years.. The most serious obstacle to extensive development of rubber in these countries at present is what is known as the South American leaf disease. Plant pathologists, however, express confidence that the disease can be kept under control and eventually limited.

Still another assertion of the crude rubber situation came from Representative Anderson, of California, who has asked that $100,000 of the requested $1,000,000 appropriation be earmarked for an investigation of the possibilities of increasing the domestic rubber supply from the guayule plant. He said that the plant could be grown in almost any semi-arid part of the United States and that it had been developed in the Salinas Valley in California to a point where each shrub yielded approximately 25% of rubber.

Rubber Research Group Meets

A meeting of the Rubber Research Committee of the Sub-Division on Rubber and Plastics of the American Society of Mechanical Engineers was held at the Engineering Societies Building in New York City on May 23. Felix L. Yerzley, of DuPont, chairman of the Sub-Division, presided. A report listing numerous questions on and about rubber, the answers to which are desired by mechanical engineers in the automotive, aircraft, railway and other fields, based on an extensive survey, was presented by J. F. Downie Smith, of the Edward G. Budd Mfg. Co., Philadelphia. Discussion was held on the best means of putting information on the properties and characteristics of rubber into the hands of the mechanical engineers. The Committee, which was formed last December at the Philadelphia meeting of the A.S.M.E., has as its purpose the mechanical evaluation of rubber for design purposes.

New Portuguese Tire Factory

Permission to construct a tire factory in Portugal has been granted by the government of that country to Carlos Farinha. The grant provides exclusive rights for tire manufacture for the next ten years and obligates the factory operator to consume raw material of national or colonial origin whenever possible, including rubber of colonial origin as soon as Portugal's colonies are in a position to furnish quantities and qualities desired.

Cascade Purchases New Plant

Cascade Rubber, Inc., now located at 2050 Water Street, Cuyahoga Falls, Ohio, has purchased a two-story brick and steel building at 2828 Second Street, that city, the former warehouse of the Falls Paper Box Co. The company, which manufactures a full line of tire repair materials, will move into its new building as soon as extensive alterations are completed.

RUBBER QUOTA SET AT 80% FOR BALANCE OF THE YEAR

Meeting in London on May 21, the International Rubber Regulation Committee, which continues to function efficiently despite events abroad, fixed the quota for the third and fourth quarters of the current year at 80% of basic quotas. This is the same percentage allowed for the first half of the year.

The action of the committee was expected in trade circles, despite recent talk of a 10% cut, in view of the increased difficulties in recent weeks of shipping rubber from the Far East. The committee apparently took into consideration the delay of shipments from Malaya and other points through the closing of the Mediterranean and the imminence of total warfare in England.

Under the 80% quota, potential rubber supplies from agreement countries, excluding Thailand and French Indo-China, amount to approximately 99,000 tons per month. Since shipments from Thailand, French Indo-China and non-agreement countries amount to approximately 11,000 tons per month, new supplies for the balance of the year should total approximately 110,000 tons per month.

World absorption of crude rubber is currently running at a rate approximating 90,000 to 95,000 tons per month, so that the 80% quota provides for a surplus of between 10,000 and 15,000 tons per month. This monthly surplus will serve to build up a bigger reserve than the five months' supply now estimated to be available on hand and afloat to the United States.

According to recent reports, Sir John Hay, British member of the Regulation Committee, is on his way to Washington. It is believed that his trip has some connection with administration plans to build up stocks of rubber in this country, greater than those specified in the recent barter arrangement of cotton for rubber negotiated between the United States and England.

DESCRIBES GOVERNMENT TESTS FOR BULLET-PROOF INNER TUBES

Government-specified tests for bullet-proof inner tubes, during which the tubes must not lose more than 60% of their original air content, were recently described by John L. Collyer, president, B. F. Goodrich Co.

First, after a warm-up of four hours, made either consecutively or on separate days, the tube is punctured in a moving wheel by three bullets fired from a .30-calibre Springfield rifle at 50 yards.

The wheel is driven for a half-hour, following which it is again punctured by three shots. This latter procedure is repeated after a further 30-minute interval. Then a shot is fired through the plane of the tire.

Following a third half-hour lapse, during which the tube remains in service, it is punctured by five shots which must be spaced within a 1-inch circle. The tube then remains in service for a full hour.

The bullet-proof tubes made by Goodrich, according to Mr. Collyer, are a military adaptation of the "Sealomatic" tubes now marketed by the company for passenger car use. Triple layers of special rubber compounds, the innermost of which is semi-viscous, give the military tube the ability to seal holes made by machine gun and rifle bullets on moving wheels without considerable loss of air pressure.

New Dewey & Almy Plant

Dewey & Almy Chemical Co., Cambridge, Mass., has purchased a 5½ acre plot at South Meade Avenue and 51st Street in Chicago, Ill., for a new plant. The first unit, which will cost approximately $125,000, will provide about 30,000 square feet of floor space.

The role of glycerine in the rubber industry is currently being depicted by use of three-dimensional figures in a novel glycerine exhibit at the New York Museum of Science and Industry, Rockefeller Center, N. Y. The exhibit translates the story of glycerine and its uses in major industries for the general public.

Name Conciliator for Industry

William C. Liller, a conciliator since 1918, has been assigned as special conciliator for the rubber and chemical industries by Secretary of Labor Perkins. Conciliators for the steel, shipbiulding, aeronautical, machine tool, building, and oil industries have also been named. The duty of these conciliators is to keep watch over labor relations in the industry to which they have been assigned. They will cooperate with both employers and employees and with Sidney Hillman, vice-president of the C.I.O., in his new job of mobilizing labor resources for national defense work.

Tire Price Wars Threaten

Present indications point to an early outbreak of price wars in the tire industry, similar to those profit-destroying wars prior to 1937. A foretaste of the price battle to come was given by the recent introduction by Goodyear of its "All-American" tire, offered at prices below those quoted in mail order flyers. Goodrich, Firestone and U. S. Rubber quickly met Goodyear's move by lowering prices on their fourth-line tires, as did many of the private-brand distributors. The main irritant in the tire picture today is said to be the steady gain in the sale of private-brand tires.

WITCO CELEBRATES ITS TWENTIETH ANNIVERSARY AT MEETING IN CHICAGO

The 20th anniversary of Wishnick-Tumpeer, Inc., manufacturers and distributors of the well-known line of Witco materials, was celebrated by the company at its national sales convention, held May 3 and 4, at the Hotel Congress, in Chicago. The convention was attended by all of the officers and executives, including the heads of the operating and technical staff, a group photograph of whom is reproduced above. Several interesting papers were presented during the convention on products of the company's manufacture. An interesting feature of the program was a tour of the new Witco research and development laboratory and the recently completed asphalt plant. It was pointed out that the rise of Wishnick-Tumpeer from a small office in Chicago to a position of world importance in twenty years parallels the rise of the American chemical industry itself. The company is to be congratulated on its anniversary.

DUTCH RUBBER SHIPMENTS ARE NOW BEING RELEASED

Several consignments of rubber shipped to New York from the Netherlands East Indies, which were tied up since the middle of May due to the inability of importers to obtain guilders called for by purchase contracts, were released about June 6 when dealers completed arrangements for substituting dollars for the Netherlands currency.

Most of the rubber released, it was reported, was covered by contracts calling for May guilder payments, and when the banks were unable to furnish the required guilders the buyers decided to consider exchange contracts cancelled and paid the equivalent in dollars. Additional shipments were expected to be released as rapidly as the guilder contracts covering them mature.

The entire situation was of course caused by the German invasion of Holland. Shortly after the invasion New York City banks received cabled instructions from the Netherlands East Indies to tie up rubber en route to the United States upon arrival. The shippers, who had contracted for payment in Amsterdam, which had been made impossible, were demanding dollars at a rate which most importers refused to pay. The shippers held that their contracts were voided since payment could not be made in Holland, and that they were not bound to deliver rubber in New York for guilder payments.

Crux of the Situation

Many importers had purchased their guilders in advance and to have made full payment of the rubber in dollars would have meant losing completely the funds spent some time ago in purchasing Dutch exchange. For those who had not bought guilders in advance, it was proposed that payments be made in dollars at the last quotation of the guilder, which approximated 53 cents. The importers objected, however, on the ground that the quotation was much higher than that of the guilder in which their contracts were originally written.

Although the New York banks, which are actually consignees of the rubber shipments in view of letters of credit naming them, have not agreed on any collective method of arranging payments on the rubber involved, they are individually coming to agreements with the importers concerned. No great difficulty is foreseen where the balance of the shipments are concerned.

Various estimates have been made as to the total amount of Dutch rubber affected by the guilder situation, ranging from 5,000 to more than 20,000 tons. Those giving the lower estimate insisted that of the 25,000 tons of Dutch rubber afloat at the end of April, 75% represented rubber purchased on sterling contracts. Others claimed that 50% was purchased on guilder contracts.

Out of the confusion, however, two facts present themselves: (1) That in all cases where letters of credit specified guilder payments the letters are being cancelled and new ones substituted which call for payment in dollars, and (2) That the Netherlands East Indies government has assured American importers that shipments would not be held up pending the arrangement of suitable methods of payment, but would be sent along as rapidly as possible with final arrangements to be made in New York.

Coming Events

June 17-21. American Society of Mechanical Engineers, Milwaukee, Wisc.

June 21. Rhode Island Rubber Club, Wannamoisett Country Club, Rumford, R. I.

June 24-28. American Society for Testing Materials, Atlantic City, N. J.

July 19. Boston Rubber Group, Annual Outing.

Sept. 12-13. Rubber Division, A.C.S., Annual Meeting, Book-Cadillac Hotel, Detroit, Mich.

Oct. 7-11. National Safety Congress, Stevens Hotel, Chicago, Ill.

Deny Waterman Allegations

The report of Referee Walter J. Carlin, in which he denied the charges that the late Frank D. Waterman, as sole trustee of the estate of Lewis E. Waterman and president of the L. E. Waterman Co., caused the concern to lose several millions of dollars from 1928 through 1938 by virtue of mismanagement and negligence in the conduct of the business, was approved by Surrogate George A. Wingate in Brooklyn, N. Y., on June 5. The estate owns most of the stock of the fountain pen manufacturing business. The charges were made by Elisha H. Waterman, one of the successor trustees of the estate, who objected to the accounting and supplementary account on the estate of Lewis E. Waterman as filed by the executors of the estate of Frank D. Waterman.

Reed Laboratories Organized

Reed Laboratories, Inc., was recently organized by E. G. Reed at 41 South High St., Akron, Ohio. The concern will do creative work in connection with stretched and laminated Pliofilm and with the electro-forming of metals. Mr. Reed was previously associated with the research department of Goodyear and has also served with the chemical research division of the National Bureau of Standards.

NEW ECONOMIES PROVIDED BY SMALL-DIAMETER WIRES

New economies for users of electrical current are provided in the small-diameter wires which permit twice as many circuits in a conduit, cutting rewiring costs considerably in most instances. The new wiring, made possible by developments in "thin wall" insulation, is somewhat similar to that which has been used with entire satisfaction in naval and signal work for the past ten years.

Several brands of small-diameter wire, with either rubber or plastic insulations, are already on the market, notably "Dilec," a rubber-insulated wire with a protective overlay of cotton and rayon threads, rolled on rather than braided as formerly, a development of the National Electric Products Corporation, which has licensed U. S. Rubber, Roebling, and others to make similar wire; "Laytex," which features latex rubber and fiber insulation, product of U. S. Rubber; "Latox," also latex and fiber, developed by Simplex Wire & Cable; and "Flamenol" and "Hazakrome," products of General Electric and Hazard Insulated Wire, respectively, both of which have synthetic insulations.

The insulating ability of the new type of wire is such that one No. 14 building wire, for example, which formerly had an all-over diameter including insulation of 0.2-inch now will carry just as much current with just as much safety within an over-all diameter of 0.13-inch. Other wire gages thin down in similar proportions. The electrical industry has finally persuaded national insurance underwriters and local fire and safety authorities to permit the use of the new wire as replacements in existing conduits on branch circuits.

Fire Group Approves Revisions

The National Fire Protection Association, which held its annual meeting in Atlantic City last month, as expected, gave full approval to revisions in the National Electrical Code, one of these revisions pertaining to use of the new small-diameter wires. Although the new revisions will not become fully official until next November, when the American Standards Association meets and makes them "American Standards," progressive inspectors in such cities as Chicago, New Orleans, Salt Lake City and Portland, Oregon, have already authorized their use.

Significance of the small-diameter wire to owners of office buildings, apartment houses, factories and better homes, which have become obsolete electrically as a result of need for additional current for air conditioning, improved ventilation, better lighting, and new electrical appliances, lies in the fact that they can now modernize these buildings economically since present conduits can be utilized, rewiring being accomplished by "fishing" and "pulling" rather than tearing-out the old conduits and replacing them with new ones.

BUFFALO RUBBER GROUP HOLDS INITIAL MEETING

The first meeting of the recently-organized Buffalo Group, Rubber Division, A.C.S., was held on June 4 at the Lenox Hotel in Buffalo, N. Y. Approximately 75 would-be members and guests attended the meeting, which was arranged by an Organizing Committee composed of B. W. Wetherbee, John S. Plumb, Michael Berman, Warren Jones, and W. R. Sheridan.

Elections held during the meeting resulted in the naming of John S. Plumb (U. S. Rubber Reclaiming) as chairman of the new group; Michael Berman (Hewitt Rubber) as vice-chairman, and B. W. Wetherbee (Globe Woven Belting) as secretary-treasurer. The following were elected members of the Executive Committee: M. L. Allard (U. S. Rubber Reclaiming), J. M. Cranz (Cranz Rubber), and H. E. Elden (Dunlop).

E. B. Curtis, of the R. T. Vanderbilt Company, who is also Chairman of the Rubber Division, A.C.S., attended the meeting and brought with him the good wishes of the Division for the success of the new group. Mr. Curtis, in a short address, traced the history of the Rubber Division and the formation of the various local groups, briefly outlining the relationship between the groups and the parent body. He also spoke for a few minutes on human efficiency and urged laboratory and research workers to give immediate attention to all problems brought to them by company customers so that the greatest good could be accomplished in the shortest possible time.

The entertainment portion of the meeting was in the hands of H. Walter Grote, of the United Carbon Co., who was in top form. Mr. Grote not only mystified his audience with his usual display of hand and card tricks, but duplicated the rope and numbers tricks which were performed by J. Elder Blackledge, well-known magician, at the banquet of the Rubber Division held in Cincinnati last April.

Rhode Island Club Meets June 21

The summer meeting of the Rhode Island Rubber Club will be held on Friday, June 21, at the Wannamoisett Country Club, in Rumford, Rhode Island. Golf will be played all afternoon, with prizes awarded to the winners of various events. The green's fee is $1.00. Following dinner, which is scheduled for 8:15 P.M. sharp, Dr. Theodore Collier, Professor of History and International Relations at Brown University, will speak on "What Is the War About?" Tickets, $1.50 for members and $1.75 for non-members, may be secured from, or reservations made with, the secretary of the club, J. E. Marshall, Jr., c/o Collyer Insulated Wire Co., Pawtucket, R. I.

Warning on a Racket

It has come to our attention that members of the rubber industry are the latest victims of an old racket. This racket consists of sending letters to people from Mexico (or other countries) telling them of fabulous sums which are held in suitcases or trunks in some customhouse in the United States. The sender of the letter, generally claiming to be imprisoned, offers part of the fictitious sums if the recipient will help him recover them. All the recipient of the letter has to do is to go to Mexico, pay certain legal expenses, and then collect. Two names used in connection with this racket are Jose Garcia and Rafael Diaz, both of Mexico City. The United States Post Office has been advised of the re-birth of the racket.

Approve Advertising Standards

Ten standards for tire advertising and selling were approved on June 5 by representatives of the major tire manufacturers and of chain stores, department stores and independent tire dealers in the Metropolitan New York Area, at a meeting sponsored by the Better Business Bureau of New York, Inc., held at the Advertising Club. Copies of the standards will be distributed by the Bureau, which maintains headquarters at 280 Broadway in New York City, to all national and retail advertisers of tires and to advertising departments of newspapers in the New York area for their endorsement and cooperation. Adoption of the standards was the culmination of almost a year of work with the industry and the Federal Trade Commission.

Outing Held by New York Group

The New York Group, Rubber Division, A.C.S., was scheduled to hold its annual outing on June 14 at the Green Meadow Club, Harrison, Westchester, N. Y. A full program of sports activities was scheduled, including golf, soft ball, tennis, darts, horseshoes and tug-of-war. J. de C. Van Etten, of Vansul, Inc., was chairman of the Outing Committee. A full report will appear in the next issue.

Akron Group Holds Outing

The annual outing of the Akron Group, Rubber Division, A.C.S., was scheduled to be held on June 14 at the Silver Lake Country Club in Akron. Following the Group's usual program, golf was to be the feature of the day, with prizes distributed to winners in various events. J. B. Waite, of Dugan & Campbell, was general chairman of the outing.

LOS ANGELES RUBBER GROUP HAS LAST MEETING OF SEASON

Approximately 65 members and guests attended the final supper meeting of the 1939-40 season of the Los Angeles Group, Rubber Division, A.C.S., held at the Mayfair Hotel in Los Angeles on June 4. The next scheduled event for the group is the annual deep sea fishing excursion while the next supper meeting will not be held until October 3.

Two motion pictures were shown at the meeting, "The Thirteen Golden Cities" which depicted details in the building of the Metropolitan Water District project in California, and "Sun Valley, a Resort for Both Summer and Winter" which contained some excellent views of the popular resort. The latter film was shown through the courtesy of the Union Pacific Railway Company.

Door prize of the evening, a garden hose presented by the B. F. Goodrich Company through the courtesy of J. C. Herbert, general manager of the Los Angeles plant, was won by G. W. Craig (U. S. Rubber), and the special prize, a tire presented by the Miller Rubber Company, through E. K. Kantzer, west coast district manager, went to E. H. Lewis (Western Insulated Wire). Table favors were distributed by A. Schrader's Sons, through John Hoerger, district manager.

It was announced that this year's deep sea fishing excursion will be held on June 21 and 22. Members and guests will sail from San Pedro Harbor on the evening of June 21 for Catalina Island, arriving there in time for dinner. They will move out of Catalina waters on the morning of June 22. Suitable prizes will be distributed for various fishing achievements, securing and distributing of prizes being in the hands of Carl Stentz. Ed Royal and other ardent fishermen of the group are in charge of general arrangements.

Reclaim Symposium Presented

A Symposium on Reclaimed Rubber was the feature of a special meeting of the Chicago Group, Rubber Division, A.C.S., held at the Hotel Sherman in Chicago on June 7. G. K. Trimble, vice-president, Midwest Rubber Reclaiming Co., first presented the motion picture film "It Might Happen Here," which indicates the invaluable use to which reclaim would be put in case crude rubber supplies were no longer available, following which three papers were presented, as follows: *Use of Reclaim in the Tire Industry*, by E. B. Busenberg (Philadelphia Rubber Works); *Use of Reclaim in Mechanical and Hard Rubber Goods*, by H. F. Palmer (Xylos Rubber); and *Use of Reclaim in the Manufacturing of Sponge Rubber*, by J. S. Plumb (U. S. Rubber Reclaiming).

NAMES IN THE NEWS

J. Edward Trainer, who joined the Firestone Tire & Rubber Company in January, 1939, as general production manager for all of company's plants, was elected a vice-president of the company on May 31. He will retain his duties in charge of production.

John T. Blake, associate of the late Charles R. Boggs, has been appointed director of research of the Simplex Wire & Cable Co., Cambridge, Mass. Henry A. Morss, Jr., a vice-presidnet of the company since last February, has been made factory manager.

Samuel H. Clark, president, Whittaker, Clark & Daniels, Inc., was tendered a testimonial dinner at the Hotel Biltmore in New York City on May 3 by employees and friends to commemorate the fiftieth anniversary of the company and his forty-second year of service. He was presented with a gold watch and numerous other gifts.

P. Jago, Deputy Agent for the Malayan Government in London since 1935, was recently elected chairman of the British Rubber Publicity Association, and A. C. Matthew, a partner of Messrs. Robertson Bois & Co., tea and rubber company secretaries in London, was elected vice-chairman.

T. G. Graham, vice-president, B. F. Goodrich Co., Akron, has been elected president of the City Bank of Kent, Ohio. He has been a resident of Kent for the past 19 years and has served on the bank's board since 1933.

F. P. Dinsmore, assistant to the factory manager, Goodyear Tire & Rubber Co., Akron, was the opening speaker at commencement week activities of the Case School of Applied Science, Cleveland, held late last month. He received the honorary degree of doctor of engineering for his work in chemical research.

Harry L. Fisher, research division, U. S. Industrial Alcohol Co., Stamford, Conn., long associated with the U. S. Rubber Co., was elected president of the American Institute of Chemists at the Institute's annual meeting held in Atlantic City, N. J., the week of May 13.

Robert McTammany, assistant sales manager, tire division, B. F. Goodrich Co., Akron, one of the most popular figures in tire sales circles, has retired from active service with the company because of ill health. He has been associated with the industry since 1905.

George E. Price, purchasing agent, Goodyear Tire & Rubber Co., Akron, was elected president of the National Association of Purchasing Agents at the 25th annual convention of that association held in Cincinnati on June 3-6. He served last year as vice-president of District No. 6 of the association.

John Tronson, formerly connected with Goodrich, General Cable and North British Rubber, has joined the R. T. Vanderbilt Co. He will assist K. Cary on technical sales to the wire and cable industry and will cover the Central West and Canadian territories, operating out of Buffalo, N. Y.

Col. David M. Goodrich, chairman of the board, B. F. Goodrich Co., was elected chairman of the National Industrial Conference Board last month. He succeeds E. Kent Hubbard.

Fred H. Pinkerton, manager, sales promotion, mechanical goods division, U. S. Rubber Co., New York, was elected president of the Industrial Marketers of New Jersey, a chapter of the National Industrial Advertisers Association, last month.

John A. MacMillan, chairman of the board, Dayton Rubber & Manufacturing Co., was elected president of the Dayton Chamber of Commerce at a meeting of that organization held on May 23. He has served repeatedly as a director of the association, and last year acted as national councilor.

Dr. M. C. Teague, director, new products department, U. S. Rubber Co., New York, described recent developments in the application of latex to textile fabrics before a meeting of the American Association of Textile Chemists and Colorists held recently at Rochelle Park, N. J.

H. I. Cramer, assistant professor of chemistry at Akron University and secretary of the Rubber Division, A.C.S., was elected president of *Phi Sigma Alpha*, scholastic honorary society, last month. Fred Theiss, of the General Tire & Rubber Co., was named vice-president.

Lammot du Pont Copeland was elected a director of the U. S. Rubber Co. at a meeting of the directorate held in New York City on May 8.

F. P. Peters has been named assistant manager, roller division, Dayton Rubber & Manufacturing Co., Dayton, Ohio. He has been with the company for some time.

Changes at Titanium Pigment

A number of changes in the personnel of the Titanium Pigment Corporation were announced following the annual meeting of the concern held on June 3. G. W. Corddry, formerly eastern sales manager, has been appointed general sales manager in place of I. D. Hagar who will devote more time to executive duties. Mr. Corddry was also elected to the directorate as was L. G. Reichhard, production manager. D. W. Edgerly, formerly western sales manager, was elected a vice-president, but will still be connected with sales activities. Other changes follow:

K. W. Ericson, formerly in charge of sales in the Chicago area, becomes western sales manager; R. S. Perry, Jr., sales representative in the midwestern states, is now assistant sales manager with headquarters at New York; H. L. Jungmann, sales office manager at St. Louis, has been transferred to the new western sales office in Chicago; E. L. Eliot has been transferred from the New York to the Chicago office and will represent the company in the western territory; and H. E. Bottemiller, formerly with the Cook Paint & Varnish Co., joins the company as sales representative in the Ohio territory.

Additions to Barrett Staff

C. A. Meyer, formerly with the technical sales department of the Firestone Rubber & Latex Co., and A. W. Browne, formerly with the raw materials research department of the B. F. Goodrich Co., have joined the Barrett Co., manufacturers of rubber compounding materials. Mr. Meyer has been added to the technical sales department at the company's headquarters, 40 Rector St., New York City, while Dr. Browne will work with the rubber laboratory staff at the Edgewater, N. J., plant. F. E. Bell, Jr., formerly connected with the Bolta Co., has also joined Barrett's technical sales staff, and will cover the Ohio territory.

Must Mark Retreaded Tires

The New York State Legislature has passed an act which makes it illegal for any dealer to sell retreaded, recapped or recut tires "unless the fact that such tire has been retreaded, recapped or recut is plainly shown by a mark or label in the English language on both side walls thereof." Violation of the act will constitute a misdemeanor.

Japanese Synthetic Rubber

According to reports, the Japan Carbide Industrial Company, Tokyo, Japan, will shortly begin the production of synthetic rubber by a chloroprene process. The process is said to have been developed by Dr. Otake of the Osaka Imperial University. The company also plans the early production of toluene.

PROGRAM IS COMPLETED FOR A.S.T.M. MEETING ON JUNE 24

The program for the Forty-Third Annual Meeting of the American Society for Testing Materials, to be held in Atlantic City, from June 24 to 28, has been completed. In addition to committee meetings, at which reports will be made and papers presented, features include the President's Address by H. H. Morgan on "Standard Specifications for Materials and Their Commercial Importance", the 15th Edgar Marburg Lecture by P. H. Bates on "Portland Cement—Theories and Specifications," and an address by Lt. Col. W. C. Young on "Materials Standards in Industrial Preparedness."

The report of Committee D-11 on Rubber Products, of which O. M. Hayden, of DuPont, is chairman, will be made at a session to be held at the Hotel Chalfonte-Haddon Hall, where all of the technical sessions will be held, on Friday afternoon, June 28. The report will include the first standards developed by the committee covering procedures for testing automotive hydraulic brake hose and for compression-deflection rate characteristics of vulcanized rubber.

The completion of specifications for hydraulic brake hose and for first-grade motor mounting compounds classified by physical properties will also be reported. New tentative methods of test for dynamic compression flexing (compression hysteresis and heat built-up) of vulcanized rubber will be given, together with changes in the existing tentative method for compression set of vulcanized rubber.

Other Tentative Specifications

New tentative specifications for ozone-resistant type of wire insulation will be reported as well as recommended revisions in the companion specifications covering three other types of rubber-insulated wire and cable. Revisions will be presented in the methods of testing rubber hose and the methods of testing flat rubber belting will be revised to include a kerosene-benzol swelling test applicable particularly to oil-resistant belting.

In addition to the committee report, a paper on "The Standardization of Durometers" will be given by Lewis Larrick of the B. F. Goodrich Co. An abstract of this paper follows:

> Application of the basic principles of hardness testing to portable testers is given, including a generalization covering all hardness testers used in the rubber industry. Advantages and deficiencies of hand durometers are discussed. Reasons are given why it is impossible for different instruments of a given manufacturer to give identical hardness values, although they can be adjusted to give approximately the same values by careful standardization and control. The technique used at Goodrich for Type A Shore Durometers is presented.

NEOPRENE SECTION OF THE DUPONT EXHIBIT AT THE 1940 WORLD'S FAIR

The miniature testing laboratory for neoprene depicted above is part of the DuPont "Wonder World of Chemistry" at the 1940 New York World's Fair. Resistance of neoprene to oil, sunlight, ozone and other influences is demonstrated by various testing devices. Emphasis is placed on such household items as gloves and sink scrapers.

Committee's Scope Expanded

Incidentally, it was recently revealed that the Executive Committee of the A.S.T.M. has acted favorably on the request of Committee D-11 on Rubber Products that its scope be expanded to include rubber-like materials. The new statement, outlining the function of the committee, reads as follows:

"The formulation of specifications and methods of test for products made from rubber or rubber-like materials including research investigations concerning the properties of these materials."

Committee D-11 felt this would be desirable because there are a number of synthetic materials which are not properly called "rubber" but which are coming to be used more extensively in the rubber industry. Many of these materials are being made into products which formerly were made from rubber compounds, but which now have little or no real rubber at all. These products in general are manufactured by the rubber companies and are properly considered a part of the industry's output.

This expanded scope will also cover certain other rubber-like materials which are coming into use. It is expected that eventually a good many of the materials classified under the general term "rubber-like" will be studied by the committee in its extensive standardization and research program.

Lincoln Manufacturing Moves

Lincoln Manufacturing Co., producers of proofed goods, announces the removal of their Boston office from 43 Lincoln Street to 183 Essex Street. The factory remains at 32 Dock Street in Cambridge, Mass.

Predicts Wider Use of Rubber

The prediction that the further expansion of the use of rubber and synthetic rubber as engineering materials will be one of the striking developments of the next decade, was made by David M. Goodrich, chairman, B. F. Goodrich Co., at a clinic on new opportunities in industry and its allied fields for college men and women sponsored by the University of Rochester, at Rochester, N. Y., May 7-9. "The use of rubber in combination with steel and other metals, wood, ceramics, concrete and other structural materials, to provide entirely new standards of comfort and silence, and to eliminate vibration and wear, is no longer a novelty," said the Goodrich executive. "It has now become sound engineering practice," continued Col. Goodrich, "but I believe that we are only on the threshhold of this frontier."

Gillette Petition Denied

The petition of 32 stockholders of the Gillette Rubber Co., Eau Claire, Wisconsin, for a temporary injunction to restrain further dissolution and liquidation of the company and the sale of its assets to the U. S. Rubber Co., was denied by Circuit Court Judge George Thompson at Eau Claire last month. The court held that a permanent injunction could not be secured on merits, that refusal to issue a temporary injunction would not result in irreparable injury to the plaintiffs, but would likely cause immeasurable injury to the defendant company, and that such action is not necessary to insure the plaintiff stockholders getting full value for their holdings. Absorption of the company by U. S. Rubber, therefore, is continuing.

CANADIAN NEWS

Production facilities of the Reanite Corporation, Ottawa, are now being expanded as a result of a successful three and one-half year research program devoted to the study of adhesion of rubber to metal. The company's basic product is Reanite, a synthetic resin used primarily in bonding rubber to steel. The research work has been conducted at the National Research Laboratories, Ottawa, under the direction of R. J. Reany, president of the company.

Negotiations which the company has recently concluded with the General Tire and Rubber Company of Akron and with a well known American manufacturer of rubber chemicals are expected to bring about a great increase of business. A United States subsidiary has been formed with half interest each held by the Reanite Corporation and General Tire. The rubber chemicals firm, whose identity is not yet being disclosed, has a contract making it sole selling agent for Reanite products.

The board of directors includes two men representing General Tire, Charles J. Jahant and Fred A. Mayfield, both of Akron. Other directors are Senator W. H. Sharp, Ottawa, vice-president; Holland Pettitt, Toronto, secretary-treasurer; P. C. MacLaurin, Belleville, Ont.; and Donald Dow, Trenton, Ont.

Shareholders of Canadian Consolidated Felt Company, Ltd., Kitchener, Ont., have voted formally to accept the offer of the Dominion Rubber Company to purchase the firm's assets and assume its liabilities. Dominion has controlled the felt company for some years, holding the majority of the stock.

The offer of the rubber company included a payment of $50,000 cash to release Consolidated from its indebtedness of $198,000 to Dominion Rubber, and assumption of bank indebtedness and other liabilities.

The felt company will be known in the future as the Dominion Rubber Co., Ltd., Textile Division. Business is being carried on as usual at the Kitchener plant which has seventy employees.

New factory of the Bata Shoe Company of Canada, Ltd., at Frankford, Ont., is nearly completed. About 550 workers are employed at present and this number will be materially increased as soon as production gets under way in the new building. The Bata factory site consists of a 1,500-acre tract on the west side of the Trent Canal at Frankford. The main building is 262 feet long and 60 wide, of reinforced concrete construction, five stories high. A 46 by 22 foot extension has been built at one end of the main building to house vulcanizing heaters and equipment. Machine shops will remain in the old paper mill which the company has been using as temporary headquarters since last October. Machinery is steadily being moved in and set up in the first new factory unit, while production is being maintained at the same time in the temporary plant.

The Dunlop Tire and Rubber Goods Co., Ltd., Toronto, is erecting a third floor addition to one of its buildings at a cost of $50,000. The addition will be 138 feet by 48 feet, of brick and reinforced concrete construction, and will be used for storage. Completion date is expected to be August 1.

Dominion Textile Company, Ltd., Montreal, is erecting two buildings at each of their Drummondville and Mount Royal mills to house ventilating and air washing equipment.

H. C. Jeffries, president of the Viceroy Manufacturing Co., Ltd., Toronto, producers of general mechanical goods, has been elected president of London Roofings, Ltd., London, Ont.

Richard Hughes Greene, 90, former secretary and director of Gutta Percha and Rubber, Ltd., Toronto, died suddenly May 28 on his way home to Toronto from La Jolla, California, where he had spent the winter. Mr. Greene was widely known in the boot and shoe business throughout Canada.

The Miner Rubber Company, Ltd., Granby, Quebec, reports that unusual success has attended the introduction during the past year of a complete line of neoprene boots, coats, pants, hats, gloves, aprons, heels and soles. These goods are not sold in competition with their regular rubber products but are intended for use under conditions where special protection is required against oil, grease, acid or excessive heat.

The company has also recently patented a new non-slip sole to be used on Miner Wedge Heel Boots and Lumbermens. The new type sole is particularly useful for wear on wet, slippery floors. The wedge heel itself acts as an arch support.

Canada's March export of rubber goods totaled $1,354,290, compared with $1,098,723 in February and $1,373,649 in March, 1939, according to the Dominion Bureau of Statistics. Pneumatic tire casings, valued at $624,406, accounted for almost half of the entire export, going to sixty-four countries. Rubber boot and shoe exports totaled $549,686, of which $361,676 went to the United Kingdom.

William H. Funston, Jr. president of Canadian Firestone, was elected to the executive council of the Canadian Manufacturer's Association at the annual convention held in Winnipeg during the week of May 27-31.

Earnings of the Viceroy Manufacturing Co., Ltd., Toronto, Ontario, nearly doubled during the year ended February 29, 1940, according to the statement issued by H. C. Jeffries, president and general manager. Net earnings after all charges were $102,281 compared with $55,053 for the previous year. After payment of half yearly dividends on the 6% preference shares, there was available $76,911 or $3.07 a share for the 25,000 shares of no par common stock. Sales showed a satisfactory increase over the previous year. The company redeemed $17,000 par value of preference shares and retired $25,000 of its bonds during the year, leaving a balance of $275,000 in funded debt. Surplus is up from $202,559 to $280,151.

C. W. Beaman, managing director of Banloc S.A.R., Ploesti, Rumania, spent several days at the Canadian Goodrich plant early in May. Mr. Beaman formerly was manager of tire construction for the Kitchener firm.

Technical Booklets Available

The French Rubber Institute (Institut Francais du Caoutchouc), 42 Rue Scheffer, Paris, France, has just made available a number of technical booklets, including the following: *Ultra-Rapid Testing of Rubber*, by Ch. Dufraisse and J. Le Bras; *Contribution to the Study of the Standardization of Crude Rubber*, by A. Thomas; *Hevea Culture in Indo-China*, by A. Thomas; *Applications of the Manometric Method of Measurement on the Oxidizability of Rubber—Oxidizability and Aging in the Geer Oven*, by Ch. Dufraisse and J. Le Bras; and *Problem of Crude Rubber—Its Standardization and Its Improvement Depend on the Abandonment of Common Classifications and Substitution of Standard Specifications*, by A. Thomas. All of the booklets are reprints from various technical journals. With the exception of the first booklet named, all of the booklets are printed in French.

Seeks Latex Equipment

Mohamedally & Company, 62 Metcalfe Street, Calcutta, India, advises that they are interested in the production of latex articles and are anxious to secure catalogs, prices and samples, where possible, of latex equipment, chemicals, molds, etc. Manufacturers and distributors of these supplies are requested to communicate direct with the company.

STATUS OF ACTIVITIES ON UNIFORMITY OF CRUDE RUBBER

A summary of the steps which have been taken by rubber growers with regard to improving the uniformity of rubber was recently made by G. Martin, Superintendent of Rubber Investigations, London Advisory Committee for Rubber Research (Ceylon and Malaya), London, England.

Two years ago the London Advisory Committee appointed a standardization sub-committee consisting of manufacturers, planters and Dr. Tempany, of the Colonial Office. This sub-committee, Mr. Martin revealed, has been considering two separate problems, *i.e.*, dirt in rubber and uniformity, with the following accomplishments to date:

(1) Dirt: Experiments indicate that sheet rubber frequently contains very fine particles of sand, which can be eliminated by settling diluted latex and running off all except the bottom layer. Appropriate action in the East to implement this finding is under consideration.

(2) Uniformity: Programs of research in the East and in London cover the range of variation, possibility of preparing uniform rubber on individual estates, clone rubber, and tapping methods. A draft of suggested methods of testing standard rubber has been widely circulated for criticism. Work is in progress to obtain technical standards with which uniform rubber should comply. Work is in progress to ensure that different testing laboratories can obtain the same results.

Mr. Martin also stated that a committee of technologists in Sumatra is working on standardization and a proposal for a similar committee in Malaya is now under consideration. The committees in London and Sumatra, he disclosed, are working in close touch with the Crude Rubber Committee of the Rubber Division, A.C.S. (whose latest report was published in the previous issue). One American technologist, G. G. Balazs of Goodyear, is a member of the London committee.

The progress of the rubber industry since the invention of vulcanization by Charles Goodyear was described on the "Cavalcade of America," the weekly drama broadcast by DuPont, on June 4. The life of John Sutter, whose discovery of gold in California led to the gold rush of 1848, was the theme of the program.

Parlon is the new trade-name being used by the Hercules Powder Co., Wilmington, Delaware, for its chlorinated rubber. It was formerly called Tornesit.

Sears, Roebuck & Company recently announced the production of the 40,000,000th All-State tire. The company first introduced the All-State tire in 1926.

Aetna Rubber Reelects Officers

The annual stockholders' meeting of the Aetna Rubber Co., held in Cleveland, Ohio, on April 18, resulted in the reelection of Charles Mashek as president, T. M. Sourbeck as vice-president, and E. W. Ferry as secretary-treasurer. Gordon Carr, of the company, and Philmore J. Haber, Cleveland attorney, were added to the board of directors. Expansion of the company's activities to include a line of molded refrigerator parts was announced.

O'Sullivan Rubber Co., Inc., has rented the entire sixteenth floor in the Esquire Building, 366 Madison Avenue, New York City. Former headquarters were at 511 Fifth Avenue.

FINANCIAL NEWS

Columbian Carbon Company

First Quarter: Net profit of $1,018,639, after all charges and taxes including $185,379 profit on sale of securities, equal to $1.90 each on 537,406 shares of no-par value capital stock outstanding. This compares with $829,878, or $1.54 a share, earned in the first quarter of 1939. Current assets as of March 31, 1940, amounted to $8,629,019 and current liabilities to $1,489,299, which compares with $6,728,792 and $1,005,850, respectively, a year ago.

I. B. Kleinert Rubber Co.

For 1939: Net profit of $289,364, equal to $1.76 each on 164,645 shares of $10-par capital stock, excluding 25,355 shares in the treasury, as compared with $211,548, or $1.27 a share on 166,095 shares of capital stock, in the preceding year. Current assets as of December 31, 1939, amounted to $2,312,098, and current liabilities to $375,756, as compared with $2,079,220 and $282,800, respectively, at the end of 1938.

Rome Cable Corporation

Year Ended March 31: Net profit of $283,813, after deducting reserve against future decline in copper, equal to $1.52 each on 189,830 shares of $5-par common stock, which compares with $213,960, or $1.12 a share, reported for the preceding fiscal year.

Norwalk Tire & Rubber Co.

Six Months Ended March 31: Net loss of $29,267, which contrasts with a net profit of $104,582 reported for the corresponding period in the previous year. Business at the factory is said to have picked up in recent weeks.

SALES OF RUBBER PRODUCTS ESTIMATED AT $653,003,000

The net sales value of manufactured rubber products of all kinds in 1939 amounted to $653,003,000, according to the Rubber Manufacturers Association. This compares with $516,089,000 in 1938 and $670,153,000 in 1937. Of the 1939 total, tires and tire sundries accounted for $399,293,000 and other rubber products for $253,710,000. The values represent net realized sales revenue, *i.e.*, gross sales to customers less trade discounts, returns and allowances, excise and sales taxes, etc.

The R.M.A. estimates that its figures, which are based on statistics compiled annually and bi-annually by the Department of Commerce, are 75% complete for 1939, and 80% for the years of 1938 and 1937.

Mechanical rubber goods showed the largest percentage increase in value over all other classifications, the 1939 net sales value of $124,589,000 comparing with $91,484,000 in the preceding year. However, it was under the $138,014,000 reported for 1937. Practically every other classification also showed gains in 1939 as compared with 1938, as follows, the figures in parentheses representing those for 1938:

Boots & Shoes, $46,916,000 ($44,520,000); Drug Sundries, $10,649,000 ($8,404,000); Stationers' Goods, $2,846,000 ($2,289,000); Bathing Apparel, $1,660,000 ($1,478,000); Miscellaneous Sundries, $7,767,000 ($4,480,000); Clothing, $2,241,000 ($2,574,000); Automobile Fabrics, $1,442,000 ($1,364,000); Other Rubberized Fabrics, $11,893,000 ($8,671,000); Hard Rubber Goods, $9,140,000 ($7,468,000); Heels & Soles, $20,050,000 ($16,281,000); Rubber Flooring, $2,057,000 ($1,590,000); Industrial Sponge Rubber, $5,943,000 ($3,442,000); Sporting Goods, Toys & Novelties, $6,517,000 ($5,621,000).

Tyrex Products Co. Organized

Tyrex Products Co., affiliated with the Tyrex Manufacturing Co., Norfolk, Virginia, has been organized to manufacture rubber footwear, mats, tubing and washers. The new concern has purchased the Gilbertville Mills, Gilbertville, Mass., and is planning to start operations within the next few weeks. Laurence N. Levine, vice-president of the Norfolk company, is president of the Massachusetts concern, and Fred H. Foss and Louis Klaff are vice-presidents; Arthur Ross, treasurer; Herman Mintz, clerk; and George O. Olson, general manager.

Goodyear Tire & Rubber Co., entered a denial on May 14 to charges brought by the Federal Trade Commission accusing it, as well as Firestone and Goodrich, with exaggerating savings on tires to customers during recent special sales. A hearing date will be set by the Commission after Firestone and Goodrich file their answers.

OBITUARIES

Harwood M. Bacon

Harwood M. Bacon, one of Cleveland's industrial leaders and long associated with the rubber industry prior to joining A. Claus Manufacturing Company a few years ago, died at his home, 3060 Chadbourne Road, Shaker Heights, Ohio, on May 22, at the age of 66. Mr. Bacon was born in Charlotte, Michigan. He was once associated with the old Diamond Rubber Company as tire sales manager, joined the McGraw Rubber Company in 1919 as general sales manager, and in 1922 became a member of the Goodrich organization. He served with Goodrich until 1930, at one point acting as Pacific Coast Manager. Mr. Bacon was a member of the Portage Country Club of Akron and of the Question Club, the national industrialists' organization. He leaves a widow and a son.

J. Arthur Nichols

J. Arthur Nichols, purchasing agent of the Mansfield Tire & Rubber Co., Mansfield, Ohio, died at the Mansfield General Hospital on June 5 at the age of 61 after a lingering illness. Born in Mansfield, Mr. Nichols served in the Spanish-American War. He had been connected with Mansfield Tire as purchasing agent for the past sixteen years and for a number of years prior to that connection was purchasing agent for the old Altman Taylor Company of Mansfield. He was a member of the F. and A.M. and of the Knights Templar. He leaves a widow.

Edward A. Pope

Edward Arnold Pope, vice-president of the Cleveland Liner & Mfg. Co., Cleveland, Ohio, died on May 11 from coronary occlusion. He was 50 years of age. Born on April 18, 1890, Mr. Pope attended Culver Military Academy. He served as a captain in the 802 Pioneer Infantry during the World War and saw active service in France. He was a member of the Masonic Order. Mr. Pope is survived by his father, F. Alton Pope, and a brother, Ervin C. Pope, both connected with the Cleveland Liner concern.

Harry A. MacKusick

Harry A. MacKusick, who retired as sales manager of the Philadelphia Rubber Works only a few months ago after serving for twenty-six years with that company, died on May 13 in a hospital at Berea, Ohio, as the result of an automobile accident a few days earlier near Medina, Ohio. He was 63 years of age. Mr. MacKusick was born in New England and prior to joining Philadelphia Rubber was associated with the old Diamond Rubber Co. Mrs. MacKusick, who was injured in the same accident, is still reported in a serious condition.

W. W. Stephen

William W. Stephen, general foreman of the milling, calendering and crude rubber divisions, Goodyear Tire & Rubber Co., Akron, died on May 5 in the Akron City Hospital at the age of 54 after an illness of 10 weeks. Born in Reading, Penna., in 1884, he started with Goodyear in 1918 as an inspector, became shift foreman in 1919, and was made general foreman the following year. He was a 32nd degree Mason.

Axel J. Leander

Axel J. Leander, industrial engineer at the Hastings-on-Hudson, N. Y., plant of the Anaconda Wire & Cable Company, died on May 22 at the Dobbs Ferry, N. Y., Hospital, at the age of 48. Mr. Leander served in France during the World War as a first lieutenant of infantry with the 803rd Regiment of the U. S. Army. He was a member of the Masons. He leaves a widow and a son.

Electrix Corporation Moves

The Electrix Corporation, research and development concern, specializing in the rubber and wire industries, has moved into a new plant at 150 Middle Street, Pawtucket, R. I. The new plant has an area of approximately 10,000 square feet and is equipped with the latest type of machinery, each piece of which is completely electrified and equipped with its own controls and motors so that no overhead shafting is required. One of the firm's specialties is the production of sample cavity molds for experimental purpose.

To Hold Chicago Exposition

Plans for the first exposition to be held in Chicago under the sponsorship of the Chicago Section of the American Chemical Society are nearing completion, according to R. C. Newton, of Swift & Company, chairman of the committee in charge of arrangements. The exposition will be held December 11 to 15 at the Hotel Stevens and will give emphasis to chemical products. Offices have been opened by the committee in charge at 110 North Franklin St., Chicago.

General Strike Continues

As this is being written (June 7) the strike at the Akron plants of the General Tire & Rubber Company is entering its ninth week. Charges and countercharges have been made by both the union and the company management. William O'Neil, president of the company, termed the strike a "wildcat" affair in a letter sent in response to one from the union. He claimed that the walkout was effected without any formal complaint to the management, as provided for in the union agreement, and stated that the company is anxious to negotiate under the terms of their contract.

Status of Guayule Rubber

The current status of guayule rubber production was recently revealed in the annual report to stockholders of the Intercontinental Rubber Co., New York. According to the report, guayule production continued without interruption at the Catorce and Cedros factories in Mexico throughout 1939. Late in that year the Torreon factory was placed on a single-shift basis and is now operating at approximately 60% of normal capacity. If present production continues on the same basis for the balance of the year it is estimated that 8,500,000 pounds of guayule will be cultivated.

Titanium Pigment Corporation has moved its Western sales office from St. Louis, Mo., to 104 S. Michigan Ave., Chicago, Ill. All carload orders, correspondence, etc., should be sent to the Chicago office. Less than carload orders should be sent directly to the company's warehouses as formerly.

DuPont is reported to be building an addition to its neoprene plant at Deepwater, N. J. The addition, which will enable the company to double its capacity for manufacturing neoprene, is expected to be ready for operation by the Fall.

The United Rubber Workers of America has announced the chartering of nine new locals since starting its intensive organizing drive a few months ago. In addition, progress is reported in signing members at the Goodyear plant in Jackson, Mich., and the Gates plant in Denver, Colorado.

U. S. Rubber has introduced a bicycle tire made with rayon cord, the first of its type to appear. Called the U. S. Royal Rider, the new tire, because of its rayon cord body, is said to combine all around strength with lighter weight, thus assuring easier riding and longer service.

E. W. Colledge, G.S.A., Inc., has announced the removal of its New York office from 300 Madison Avenue to 52 Vanderbilt Avenue. The new phone number is MUrray Hill 6-6466.

LOS ANGELES NEWS

The K. and K. Manufacturing Company, an affiliate of the Southwestern Rubber Company, 651 S. Anderson Street, both companies owned by F. J. Keefe and Floyd E. Kite, has perfected a mold for applying colored sidewalls on automobile tires, the mold fitting any 16-inch tire. The manufacturers claim that only 12 ounces of white or colored rubber are needed for a 16 inch tire and that for black sidewalls only from 4 to 8 ounces are needed. From 10 to 20 minutes is the time required for curing, they state, so from 28 to 30 tires per day can be treated with one mold. Workers have experimented with this for many months and have treated large numbers of tires in their own factory. Any number of color schemes have been used with the thought of contrasting or of harmonizing the tire wall with the car body.

Ed Royal, local manager for H. M. Royal, Inc., accompanied by Stan Kempner, head of the Western Shade Cloth Company, Chicago, made a business trip to Sacramento early in June. Mr. Kempner, who lives in Chicago, spent four days in the Los Angeles area.

The U. S. Rubber Company plant has been running 24 hours per day and seven days per week recently, May being an exceptionally busy month.

R. E. Nicolai, manager of flooring material sales for Goodyear, was honored recently on the completion of his 20th year of service with the company.

Bob Abbott, vice-president and general manager of the C. P. Hall Company of California, has returned from a two months' business trip which took him to New York City, Philadelphia, Cleveland, Chicago, Madison and Green Bay. He reported having visited Garvin Drew in New York and Dick Hucks in Akron, both former members of the Los Angeles Rubber Group.

A large group of Goodyear executives recently met at the California plant for a sales conference. These included: H. E. Blythe, vice-president in charge of sales for tire departments; J. M. Linforth, vice-president in charge of manufacturers' sales; D. R. Mackenroth, manager of dealers' and store sales; R. E. Bolton, connected with the manufacturers' sales department; R. T. Brown, manager of tire design; K. C. Zonsius, automobile tire division manager; F. Fox, truck tire division. P. W. Litchfield, president, also visited the plant recently. Other visitors have included C. H. Maxwell, B. M. Moorhead, and G. Heathman, all of the Goodyear-Australian organization. Two of these men were on home leaves.

The annual plant-wide dance for Goodyearites, held at the Los Angeles Breakfast Club, drew an attendance of about 350. The Foreman's Club held its annual stag party at Carl's Cafe and drew an attendance of 104.

T. Kirk Hill, president of the Kirkhill Rubber Company, has completed plans for a month's vacation in Alaska. He will leave at a convenient date about the middle of June.

Jim Miller, formerly Division C superintendent at Goodyear's Los Angeles plant, and Martin Uhrich, formerly manager of the engineering division, have been transferred to Akron. A farewell party that drew 150 Goodyearites was held at the Potrero Country Club.

Frank A. Steele, general manager of Goodyear's Los Angeles plant, completed his 30th year of service with the company on June 2 and was honored by employees at a get-together where Mr. Steele was presented with a large plaque with three X's (the Roman number for 30) inscribed on it with caps from Coca-Cola and 7-Up bottles. These were used in a spirit of fun because Mr. Steele is a recognized abstainer from soft drinks.

Mr. Steele graduated from Wooster College in 1908 and attended Case School of Applied Science for two years, specializing in chemical engineering. He entered the employ of Goodyear at Akron in 1910 as a chemist and gradually rose from one position to another. When the Los Angeles plant was built he was transferred to this city as division superintendent. He has also served in the plant at Gadsden, Alabama, and for four years served as general superintendent of the plant at Wolverhampton, England. He returned to Los Angeles as general superintendent in April, 1939.

A large number of western divisional sales managers of Firestone won trips to the 500-mile race at the Indianapolis Speedway on Memorial Day in a recent sales contest sponsored by the company. A number of them are shown in the photograph elsewhere on this page. Almost all of them were back on their jobs in the west by June 5.

TOP: Some of the western divisional sales managers of Firestone who attended the 500-mile race at Indianapolis Speedway on Memorial Day as the result of a company sales contest. Leonard K. and Russell C. Firestone are in the group.

BOTTOM: Frank A. Steele, third from right, superintendent of the Los Angeles Goodyear plant, receiving a plaque on his 30th anniversary with the company.

NEW NOVELTIES and SPECIALTIES

Caster Unit Pneumatic Tire

For what is said to be the first time, a practical pneumatic tire designed for use on a swivel caster unit on industrial trucks has been perfected by the Gen-

eral Tire & Rubber Co., Akron, Ohio. Previous efforts to develop a pneumatic tire which would operate efficiently on a caster unit had failed, according to General Tire engineers, because of the wiping action caused by the comparatively large area of rubber in contact with the floor surface. This condition prevented the caster wheels from turning as easily as was required. The difficulty was said to have been solved by building up a thick, heavy-duty, 10-inch and 12-inch six-ply General industrial pneumatic tire, with a smooth, narrow tread. By using these tires on a heavy-duty caster wheel unit in front and regular 18, 20 or 22-inch six-ply industrial tires on the rear, platform trucks should carry a maximum pay-load with perfect performance.

New Seiberling Tire

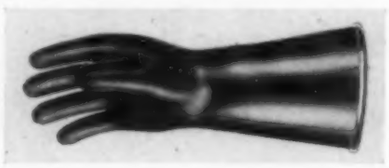
A new Seiberling Heavy-Duty Truck and Bus Balloon tire, which replaces the Heavy-Duty design now in the company's line, has been introduced by the Seiberling Rubber Co., Barberton, Ohio. The new tire is made of low-stretch cord which helps to increase mileage, protects against breaks and bruises, and gives better service generally. Its shoulder design permits maximum cooling in the shoulder area where the greatest amount of flexing occurs. The side-wall has a "built-up" terrace effect which gives the tire a husky, full-size appearance. The tread is of the rib-type design.

Air-Wedge Rubber Soles

What is termed the "most scientific rubber sole ever presented" is being manufactured by the Kirkhill Rubber Co., 811 West 58th St., Los Angeles, California, under the name of the Reeves' Air-Wedge Rubber Sole. The sole, which is scientifically designed to fit the contour of the foot, is made of composition rubber and molded in one piece. Alternative cut-outs in the sole give the same amount of support as did earlier soles designed by Dr. R. R. Reeves, but cut the weight down to a minimum. These cut-outs also leave a dead air space under the insole of the shoe which reduces heat from hot pavements. The soles, the principal features of which are lightness in weight, flexibility and positive support, may be obtained in blue, red, brown and natural. They will be known as the "California Air Wedge by Reeves."

Curv-Flex Glove

Called Curv-Flex, a new type of electricians' glove which not only is shaped to the contour of the hand but is also scientifically designed in fingers, wrist and cuff to afford greater freedom and comfort, has been introduced by the Miller Rubber Co., Akron, Ohio. Made



by the Anode Process, the new glove is said to afford workers maximum protection at all times. Laboratory tests have indicated that the new glove will withstand repeated electric tests over long periods and that they have high resistance to current leakage even after soaking in water. Curv-Flex gloves are available in 14-inch length with rolled bead cuff in 10, 10½ and 11 sizes.

Neoprene Laboratory Stoppers

A complete line of laboratory stoppers made of neoprene, DuPont's chloroprene rubber, has been introduced by R. W. Rhoades Metaline Co., Inc., P.O. Box No. 1, Long Island City, N. Y. Exhaustive tests, over a long period of time, with oils which ordinarily break down natural rubber, showed that the neoprene stoppers are able to stand up against conditions of service that shorten the life of natural rubber stoppers.

Yegg Beater Window Lock

Designed to eliminate the weaknesses of ordinary locks, the Yegg Beater Window Lock has been announced by the

"YEGG BEATER"
WINDOW LOCK
Lets fresh air in . . . keeps prowlers out.
Protects children from falling thru window.
Prevents rattling.
PATENTS PENDING
To open window wide, lift out rubber wedge. Window slides past metal holder.
Discard the tubes that hold the screws on the cord.
ALSO IDEAL FOR DOOR STOPS
Mfd. by Mogul Corporation • Minneapolis
(OVER)

Mogul Corporation, 203 Loeb Arcade, Minneapolis, Minn. It consists of a rubber wedge and metal holder, and is said to be the only lock on the market which permits the upper and lower window sashes to work directly against a cushion of rubber. It is tamper-proof and cannot be released from the outside. It also can be used as a door stop by fastening it to the floor near the wall, or used in various places throughout the house as a rattle eliminator.

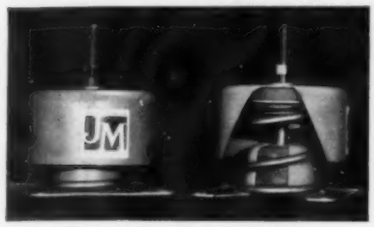
Manhattan Rubber Fenders

Rubber mud-guards or fenders for buses and trucks, under the trade-name of Dreadnaught, have been added to the line of automotive products featured by the Manhattan Rubber Manufacturing Division of Raybestos-Manhattan, Inc., Passaic, N. J. These relatively new prod-

ucts are manufactured with a strong fabric reinforcement and high tensile rubber stocks which provide for a structure much less susceptible to tearing and damage.

J-M Vibration Isolator

Designed to economically control machine vibration and reduce the resulting noise, a new, easily-installed vibration isolator has been announced by the Johns-Manville Co., 22 East 40th St.,



New York City. The working parts of the unit, known as the J-M Controlled Spring Isolator, consist of a coil spring and a rubber load pad, which support the equipment and isolate vibration, and an adjustable rubber snubber inside the base, which controls excessive motion. The new isolator was built to take care of horizontal and torsional as well as vertical vibration, and tests indicate it to be particularly efficient for the low frequency vibrations resulting from slow speeds and from many operations involving reciprocal action. The load pad is designed to overcome any high frequency vibrations. It is made in two sizes, for light and heavy duty.

Speed Splice Tape

Speed Splice Insulating Tape has been added to the line of insulating tapes merchandised by the Accurate Manufacturing Co., Garfield, N. J. The new tape, which bears the stamp of approval of the Underwriters' Laboratories, can be used in place of the conventional friction and rubber tapes. A single thickness of the new tape has a dielectric strength of between 9,000 and 10,000 volts. It has extremely high adhesion in hot or cold weather, according to the manufacturer, and forms a neat compact joint on all sizes of wire. Speed Splice Tape, which is made from special cotton sheeting treated under high pressure with super aging rubber compounds, is sold in standard rolls of 50 feet. Although standard width is ¾-inch, special widths from ½ to 30 inches are available.

Korolac No. 495 Paint

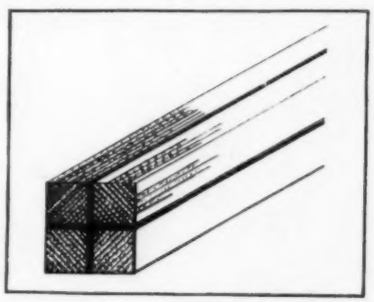
The B. F. Goodrich Co., Akron, Ohio, has introduced Korolac No. 495, a new paint which gives a semi-glossy black finish. It is recommended wherever extremely corrosive conditions disqualify other paints or coatings. A Korolac primer for use with the new paint has also been developed. Applied to metal surfaces after they have been prepared as for any other kind of paint or lacquer, the primer forms a strong bond between the Korolac and the metal itself. When dry, the new paint will withstand all acids, alkalis and salts in the concentrations commonly met with in industry, up to temperatures of 150° F. The dried film is hard and resistant to abrasion, yet sufficiently elastic to conform to contraction and expansion of the support.

Stalwart Delivery Tire

A new truck tire, known as the Stalwart Delivery Tire, designed for stop-and-go driving in thickly populated districts, has been announced by the G & J Tire Division of the United States Rubber Co., New York City. The tire, available in all popular sizes, has a specially designed wide, flat, deep tread, enabling it to resist the grinding wear of constant stop and start runs. A new type of rib tread provides quiet running, easy steering and smooth riding, according to the company, without sacrificing any of the traction necessary for safe driving on city pavements. The G & J Tire Division has also introduced a new two-color, full-molded passenger car inner tube which features a laminated base and is reinforced with a special, rust-resistant, pinch-proof rubber.

Blue Cross Packing

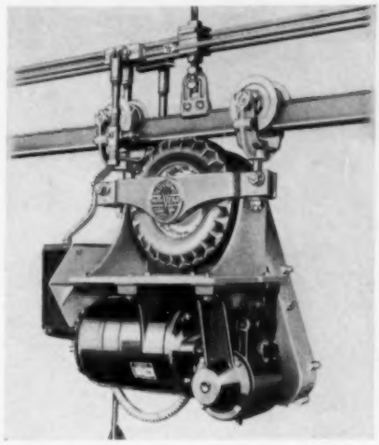
Under the trade-name of Blue Cross, a new patented rod packing has been introduced by the Majestic Packing & Rubber Corp., 1 Hudson St., New York City. The new packing is available in square cross section and in sizes from ¼-inch upward. Various combinations of rubber, duck, asbestos and neoprene or Thiokol are employed for service at specified pressure to prevent leakage of hot or cold water, ammonia, steam, acid, oils, etc. The rubber or so-called synthetic rubber cross which lies in the center of the packing (as can be noted from the accompanying illustration) acts as a cushion. The cross section is firmly secured to the four separate sections of



laminated fabric or asbestos. The fabric or asbestos is laid diagonally to provide equal movement in all directions when a packing gland is tightened. Blue Cross packing is supplied in coil, spiral and ring form.

Louden Motoveyor

A powered machine for automatically transporting loads over an overhead track system has been developed by the Louden Machinery Co., Fairfield, Iowa. Known as the Motoveyor, it may be built



into cab or step-on platform so the operator can accompany the load being moved. The simplicity and efficiency claimed for this device lies in the fact that a rubber tire is utilized for the drive wheel, as will be noted in the accompanying illustration. The drive shaft is supported in precision ball bearings located on each side of the wheel. The range of speed of the Motoveyor, made possible by the use of the tire as a drive wheel, is from 60 to 600 feet per minute.

Koroseal Hose Gaskets

One of the newest products made from Koroseal by the B. F. Goodrich Co., Akron, Ohio, is a swivel gasket for both municipal and industrial fire hose. The smooth glaze on the surface of Koroseal is said to eliminate the need for spanner wrenches and to make it possible to tighten couplings using the new gaskets by hand so they are leakproof at internal pressures up to several hundred pounds. Because they do not harden with age or lose their resilience the Koroseal gaskets will outlast rubber gaskets many times, according to Goodrich. There being practically no water absorption by Koroseal as compared to the absorption of water by rubber, the new gaskets will neither swell nor lose their shapes.

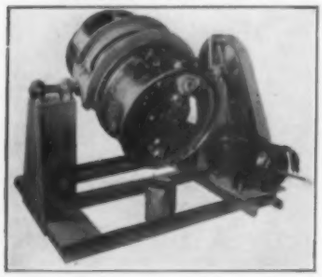
Tire for Lister Farming

A new tire for the front wheels of tractors used in lister farming operations has been developed by the B. F. Goodrich Co., Akron, Ohio. Called the Lister Ridge Silvertown, the new tire features an unusual tread angle which solves the problem of keeping tractor wheels on top of the ridges in the cultivation of listed row crops, according to Goodrich engineers.

DRUM ROLLERS and TUMBLERS

For mixing, blending and agitating in any standard capacity steel or wood container

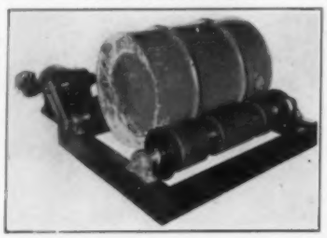
DRUM TUMBLER



With power off, drum can be rotated into any position by detachable handle on motor shaft, making it possible to add material through side bung, also to take samples or drain contents through end bung.

DRUM ROLLER

For rolling any capacity drum or barrel at any speed. Rolls of proper width are spaced to give ample support, yet clear rolling hoops and side bung openings.



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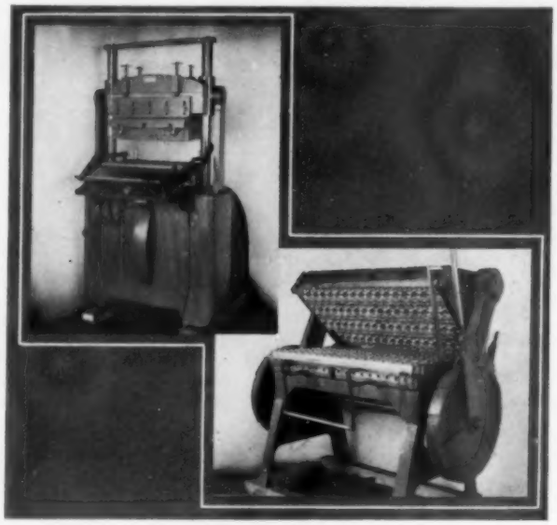
NEW EQUIPMENT

Two Types of Ferriot Presses

Included among the equipment manufactured for the rubber industry by Ferriot Bros., Inc., Akron, Ohio, are molding and preforming presses, both of which are shown in the accompanying illustration. The molding



press seen at the lower right of the illustration, with a 63-cavity mold for blown dolls mounted in position, is of the hand-operated type, although it may be supplied with motor drive if preferred. It is equipped with steel steam platens and has a platen area of 24 x 48 inches. This press, which has a piercing device lever, shown at the front of the press, is of the double action cam type. The larger of the two cams raises or lowers the head while the smaller, operated by a hand lever, locks the head under pressure. The head itself is counterbalanced by a double spring action. These presses are recommended by the manufacturer for blown rubber articles and sponge rubber products. The preforming press is seen in the upper left of the illustration. It is shown with jig for pressing rubber sheets into place in the press against the forming die in the forward or loading position. This preforming press has a die space of 14 x 24 inches, is powered with a special high torque motor with magnetic brake, and has a pneumatic timing control for timing pauses at the bottom of the stroke. Ample power is said to be provided to preform the greatest possible number of cavities which can be put into the platen area. The most common uses for presses of this type are for preforming biscuits for hollow toys and dolls, bulbs and balls.

Standard Laboratory Presses

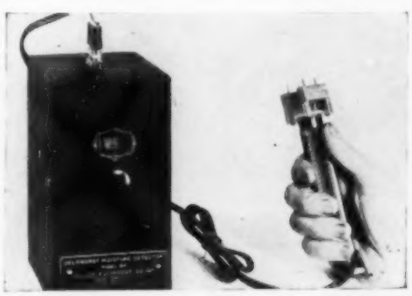
Two new Standard presses, both 20-ton laboratory models, for use in the production of mechanical rubber goods and plastic moldings, have been introduced by the F. J. Stokes Machine Co., Philadelphia, Penna. One of the new models (illustrated) is hydraulically-operated, with motor and pump contained in the base,

while the other is an air-operated press, without motor or pump. The latter model is similar to the hydraulically-operated machine, and is furnished ready to connect to a 125-pound-pressure air supply. Like the other Standard presses sold by Stokes, the new models are equipped with automatic time-cycle con-

trols, all steps in the molding cycle being performed automatically with the exception only of loading the molds and removing the finished parts. Like the others, they are also fitted with a simple, single-lever, finger-operated manual control for use in molding parts where hand operation is desired.

Delmhorst Moisture Detector

The Delmhorst Moisture Detector, which finds application in the rubber, paint, paper and other fields, is sold by the Colloid Equipment Co., Inc., 50 Church St., New York City. The detector utilizes the electrical principle whereby is measured the electrical resistance between two electrode points forced into the material, and since the resistance usually varies in direct proportion to the amount of moisture, the percentage of the latter is calibrated on a dial and thus moisture readings are made instantly and accurately. Both surface and



subsurface moisture content may be secured with the instrument. The Auburn Rubber Company, according to Colloid Equipment, is using one of these detectors to determine the amount of moisture in hot ground scrap rubber.

Stauffer Chemicals

TIRE BRAND
Commercial Rubbermakers' Sulphur, 99½% Pure

TUBE BRAND
Refined Rubbermakers' Sulphur, 100% Pure

CRYSTEX (INSOLUBLE) SULPHUR

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Books . . . .

RUBBER RED BOOK—1939 Edition
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ANNUAL BIBLIOGRAPHIES OF RUBBER LITERATURE
Compiled by D. E. Cable Ph.D.
First issue covers year 1935
Paper Bound, $1.00; Cloth Bound, $2.00

LATEX IN INDUSTRY
By Royce J. Noble, Ph.D.
Text Book on Latex. Price: $7.00

LATEX AND ITS INDUSTRIAL APPLICATIONS (Vol. I)
By Frederick Marchionna
Bibliography of latex patents and literature to June, 1932. Price: $15.00

LATEX AND RUBBER DERIVATIVES AND THEIR INDUSTRIAL APPLICATIONS (Vols. II & III)
By Frederick Marchionna
Bibliography of latex patents and literature from June, 1932 to January, 1937; rubber derivatives to January, 1937. Price: $20.00
(Combination Price, Vols. I, II and III: $30.00)

Published by

THE RUBBER AGE
250 West 57th St. New York City

New Grinding Wheel for Rubber

A wheel which is said to grind and smooth rubber rapidly and efficiently without danger of burning the work has been perfected by the Atlantic Abrasive Corp., South Braintree, Mass. The new wheel, desig-

nated as Atlantic Type B. C., is made with a patented synthetic bond which keeps the wheel cool under all conditions. Clogging, glazing and the need for frequent dressings are said to be completely eliminated. The wheels are made in two tempers, one a soft-temper for grinding rubber only, and the other a hard one for grinding leather, fiber, and similar materials. A combination form of wheel, one-half being made in any degree of coarseness and the other in any degree of fineness, is also available, this type making it possible to grind the softest rubbers to size and to produce a perfect finish with one machine operation.

New Heinrich Hydraulic Vulcanizers

H. H. Heinrich, Inc., 200 Varick St., New York City, has announced that the company is now in a position to furnish the well-known Heinrich Precision Hydraulic Vulcanizers with steam-heated as well as electrically-heated platens. These vulcanizers, primarily intended for making rubber printing plates, also find application in laboratory work and in the manufacture of hygienic rubber products. The availability of the new model makes the vulcanizers adaptable to all plants, irrespective of the heating methods employed in such plants. It is explained that the equipment necessary for steam vulcanization of the presses is furnished in compact, clean and efficient units.

BRIEFS . . .

The **Hancock Duravalve Junior,** the first and only 600-pound standard valve with an integral Stellite seat and Stellite-faced disc offered to the industrial valve user, has been introduced by the Hancock Valve Division, Manning, Maxwell & Moore, Inc., Bridgeport, Conn. It is available in sizes from ¼ to 1-inch, inclusive.

Greater accuracy and faster production in the duplication of molds, dies, etc., is said to be possible with a new low-cost **duplicating control and drive mechanism** developed by the Detroit Universal Duplicator Co., Detroit, Mich. The new mechanism can be used with any standard vertical milling machine.

REVIEWS

BOOKLETS, CATALOGS, Etc.

Suprex Clay. J. M. Huber, Inc., 460 West 34th St., New York City. 8 x 10 in. 64 pp.

A compilation of the pertinent data currently available on clay is placed at the disposal of the rubber compounder in this well-prepared booklet. A comprehensive summary of the characteristics of clays as related to rubber compounding, plus methods of evaluation practiced in the Huber laboratories, are included. Definitions of various grades of clay are given, and their respective color, particle size, characteristics, and other factors are discussed. The data appearing in the various tables are, for the most part, the results of separate studies at different times. While the same blend of rubber was not used in all cases, all studies were made on a strictly comparable basis. The studies serve to illustrate figures which may reasonably be obtained, as well as the general differences existing between various samples of clay. Amply illustrated, the booklet should be a valuable addition to the rubber technologist's library. Copies are available without cost on request to the company.

•

Handbook of White Pigments. (3rd Edition). Krebs Pigment & Color Corp., Wilmington, Delaware. 4½ x 7 in. 42 pp.

This latest edition of the company's handbook was made necessary by the fact that several important new pigments have been developed since publication of the last edition, in addition to which there has been a general improvement of existing grades as well as an expansion in the range of important pigments. For instance, "Ti-Pure" LW-R, a special pigment for rubber, is now available. Like previous editions, the handbook describes the preferred uses of various pigments made by the company including pure titanium dioxide, extended titanium pigments and lithopones.

•

A.B.C. of Spray Painting Equipment. DeVilbiss Co., Toledo, Ohio. 5½ x 8 in. 32 pp.

The material in this fundamental book on spray painting equipment is presented in question-and-answer form, the questions being those most often asked at the DeVilbiss training schools and various clinics it has conducted, while the answers are comprehensive and readily understood. Subjects treated include the paint spray gun, material containers, hose and hose connections, air transformers and condensers, and air compressing outfits. Numerous illustrations are used to bear out the text.

•

Industrial Dermatitis. National Association of Manufacturers, 14 West 49th St., New York City. Mimeographed. 6 pp.

This is a summary only of accepted medical knowledge on the subject of industrial dermatitis, prepared so that manufacturers may use it as a source of reference when dealing with the dermatitis problem in their plants. Causes, prevention and cure are briefly discussed.

•

A Complete Line of Stoppers. R. W. Rhoades Metaline Co., Inc., Long Island City, N. Y. 3½ x 6½ in.

Laboratory stoppers made of neoprene feature this folder. In addition, it contains descriptions and specifications covering stoppers made of gray, red antimony and floating pure gum rubber, as well as Kjeldahl stoppers and Bailey and Walter crucible holders.

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REVIEWS (CONT'D)

Where to Find the New Trade Names. Compiled and published by Alice M. Amoss, Librarian, Technical Library, Edgewood Arsenal, Maryland. 6 x 9 in. 32 pp. 75c.

This is a bibliography giving sources of reference books, directories, journals, etc., containing brand and trade names of products and materials of all descriptions. It is intended for use by research technologists and purchasing agents who may be interested in locating the source of supply of some particular branded product, its properties or its uses. The various directories are listed under miscellaneous classifications, ranging from abrasives to wire. Rubber and Rubber Chemicals and Rubberized Coatings are two of the many classifications.

•

Analyse van Eiwitten, Welke in Hevea-Latex Voorkomen. (Analysis of Proteins Occurring in Hevea Latex). By R.F.A. Altman. West Java Proefstation, Buitenzorg, West Java, N.E.I. 7¼ x 10½ in. 16 pp. (In Dutch, with a brief summary in English.)

The results of a series of tests to determine the proteins still occurring in the rubber-free serum obtained by coagulating latex for the preparation of sheets are given in this booklet, actually a reprint of an article from a recent issue of *Archief voor de Rubbercultuur*. The results were secured by various modifications of Brazier's method. The author discusses the proteins isolated but does not discuss their properties.

•

Artificial Light and Its Application. Lamp Division, Westinghouse Electric & Manufacturing Co., 150 Broadway, New York City. 8½ x 11 in. 296 pp. $1.25.

More than 400 photographs, sketches, pictorial tables and graphs are used to illustrate recent developments in fluorescent, electrical discharge and incandescent lamps in this latest survey of lighting practice. Simple, clear and comprehensive, it is presented in terms interesting alike to lighting engineers, students and laymen. Lighting in all of its aspects is discussed. An unusual feature of the book is that although the book itself costs $1.25, individual chapters (21 in all) may be purchased for 7c each.

•

Motor Truck Facts. Automobile Manufacturers Association, New Center Bldg., Detroit, Mich. 6 x 8½ in. 48 pp.

A number of new and significant developments in the field of motor transportation, including the 1940 report of the Federal Coordinator of Transportation, are presented in this latest edition of "Motor Truck Facts." Such data as registration of trucks, employment in the field, and taxes is given. As usual, most of the data is presented in table form.

•

Pittsburgh Catalog No. 3. Pittsburgh Brass Mfg. Co., 3252 Penn Ave., Pittsburgh, Penna. 6 x 9 in. 40 pp.

The company's line of bronze tuyere cocks, tuyere fittings, roto-flex ball pipe joints, and specialties suitable for rubber, oil, gas, chemical and other plants, is described, illustrated and priced in this catalog. The inclusion of some useful information, including building data which gives weights of various materials, weights and measures, dimensions of standard wrought iron pipe, etc., makes the catalog of greater value.

•

Armstrong's Rubber Sundries. Armstrong Cork Co., Lancaster, Penna. 8 x 11 in. 12 pp.

The company's complete line of sundries for druggists and hospitals is illustrated and described in this attractive catalog. These sundries include bulb syringes, douches, cushions, gloves, hot water bottles, medicine droppers, nipples, stopples, tubing, urinals, vaginal douches and ice caps. Features of each product are pointed out in the text.

Craftsmen in Rubber. Rubbercraft Corporation of California, 110 East 17th St., Los Angeles, Calif. 9 x 12 in.

This is one of the largest and most complete catalogs ever issued by a rubber manufacturer. It not only illustrates and describes some of the 5,000-odd products made by the company with specifications given in most cases, but also depicts some of the varied machinery and equipment used by the company in the manufacture of these products. An index makes the location of any product a simple matter.

•

Hancock Steel Valves. (Bulletin 5-7000). Hancock Valve Division, Manning, Maxwell & Moore, Inc., Bridgeport, Conn. 8½ x 11 in. 38 pp.

This new bulletin contains complete dimensions of all types of valves manufactured by the company and also complete material specifications of all metals used in the valves. In addition, it contains a section reproducing in full the A.S.M.W. service rating tables. Information on the company's Duravalve and Bar Stock Valve, formerly in separate leaflets, has been included in the bulletin.

•

Emery Facts. Emery Industries, Inc., Carew Tower, Cincinnati, Ohio. 5½ x 8½ in. 32 pp. Loose-leaf.

Issued in connection with the 100th anniversary of the company, this deluxe catalog lists the various products made, including several fatty acid products, gives the chemical and physical properties of each, and discusses their uses in miscellaneous industries.

BOOKS

Printing Inks: Their Chemistry and Technology. By Carleton Ellis. Published by Reinhold Publishing Corp., 330 West 42nd St., New York City. 6 x 9 in. 560 pp. $7.00.

As indicated by the title, this book comprehensively covers the chemistry and technology of printing inks and, of necessity, the text embraces a large field. Specifically, the author attempts to fill the needs of chemists who are groping for information on printing inks and are unable to find the subject discussed in any thorough treatise dealing with it in a modern way, an attempt which is admirably achieved. The numerous roles played by rubber in the printing ink craft are briefly referred to throughout the book, and a section of the chapter on "Special Types of Printing Inks" is devoted to a discussion of printing on rubber. The book has 18 chapters, is profusely illustrated, and has complete subject and author indexes. Of interest is the inclusion of a glossary of printing ink terms, included not so much for the ink manufacturer as for the chemist or the tyro beginning a study of printing inks.

•

Textile Testing. By John H. Skinkle. Published by Chemical Publishing Co., Inc., 148 Lafayette St., New York City. 5½ x 8 in. 272 pp. $3.00.

Methods for the physical, chemical and microscopical testing of textiles are thoroughly discussed in this book which is divided into three parts, each devoted to one of the three phases of examination. Where several methods are available, the author, who is an assistant professor of textile chemistry at Lowell Textile Institute, gives that considered best in detail and makes brief mention of the others. At the end of the description of each test a bibliography of references is given, so that those desiring further information can secure it. Brief reference is made to a rubber extraction device recommended by the A.S.T.M. for determining oil and grease in knit goods with carbon tetrachloride. The book has 17 chapters, 27 tables, and numerous illustrations, graphs and sketches.

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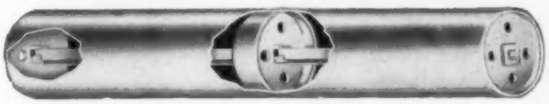

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, JUNE 10, 1940

Crude Rubber

RAPIDLY changing conditions in war-torn Europe resulted in an extremely nervous and erratic market for crude rubber during the past thirty days. The price for spot on the Exchange swung in a full 4-cent range, from 24.00 on May 10 to 20.00 on May 23. The price dropped steadily during the middle of May, despite the fact that the International Rubber Regulation Committee decided to keep the quota unchanged at 80% for the balance of the year and encouraging consumption reports in the United States. Nervousness incurred by the Belgian capitulation, Allied reverses in the field, confusion caused by the tieing up of Dutch rubber in New York because of the guilder situation, and lack of factory support, occasioned wave after wave of speculative selling. The return of factory participation and further increases in British war risk insurance served to bring the price above the 21-cent level early this month, and for the past week it hovered around a 21.50 average. Announcement by Italy today (June 10) that she had formally declared war on the Allies caused the price to jump to 22.37. An erratic price structure is looked for in the next few weeks based largely on news from the various fronts.

As of June 10

Plantations—

Ribbed Smoked Sheets—			
No. 1 Spot	—	@	.22½
July	—	@	.22¼
October-December	—	@	.20½
No. 2	—	@	.21
No. 3	—	@	.21¾
No. 4	—	@	.21½
Thin Latex Crepe	—	@	.22¾
Thick Latex Crepe	—	@	.22⅛
Brown Crepe, No. 1	—	@	.21¾
Brown Crepe, No. 2	—	@	.21½
Amber Crepe, No. 2	—	@	.21¾
Amber Crepe, No. 3	—	@	.21½
Brown Crepe, Rolled	—	@	.18½

Latex—

Normal, per lb., carload lots	—	@	.26½

Paras—

Up-River, fine	—	@	.19⅞
Acre Bolivian, fine	—	@	.20

Balata

Brazilian block	—	@	.14

LONDON MARKET

Standard Smoked Sheets—Buyers—June 10

July	12⅝	@	12 11/16d
October-December	—	@	11 7/16d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—June 10

July-September	—	@	10 7/16d
October-December	—	@	10d

Scrap Rubber

Although fairly active, the scrap rubber market has been spasmodic in the past few weeks, conditions changing rapidly as news reaches this country from Europe. Slight advances in several grades have been made since our last report, including those on boot and shoe and untrimmed arctic stocks. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton 21.00	@	22.00
Mixed auto	ton 13.50	@	14.00
Beadless tires	ton 17.00	@	18.00
Clean solid truck tires	ton 30.00	@	32.50
Boots and shoes	ton 22.00	@	23.00
Arctics, untrimmed	ton 16.00	@	17.00
Inner tubes, No. 1	lb. .10	@	.11
Inner tubes, No. 2	lb. .04½	@	.04¾
Inner tubes, Red	lb. .04½	@	.04¾

Reclaimed Rubber

Reclaimers report business dull, but express optimism for the immediate future. Consumption of reclaim in April amounted to 16,298 long tons, or 32.5% of the 50,103 long tons of crude rubber consumed. Consumption of reclaim in March amounted to 17,560 long tons. There has been no change in the price structure since our last report. Current quotations follow:

Shoe

Unwashed	lb. .06½	@	.06¾
Washed	lb. .10	@	.10¼

Tube

No. 2 (Compounded)	lb. .09	@	.10
Red Tube	lb. .09	@	.09¼

Tires

Black (acid process)	lb. .07	@	.07¼
Black, selected tires	lb. .06	@	.06¼
Dark Gray	lb. .09¼	@	.10
White	lb. .12½	@	.14
Truck, Heavy Gravity	lb. .05½	@	.06
Truck, Light Gravity	lb. .07	@	.07½

Miscellaneous

Mechanical blends	lb. .04½	@	.05

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb. .31¼	@	.31½
Peeler, carded, 23/4/3	lb. .32¼	@	.32½
Peeler, carded, 15/3/3	lb. .29¼	@	.29½
Peeler, carded, 15/4/2	lb. .29¼	@	.29½
Peeler, carded, 13/3/3	lb. .28¼	@	.28½
CHAFERS			
Carded, American, 1 1/16"	lb. .31	@	.31½
Carded, American, 1"	lb. .21	@	.26

Cotton

Cotton prices have followed erratic channels since our last report, fluctuating in a 122 point range. High for the period was 10.68 on May 27 and low 9.46 on May 18. Starting from 10.48 on May 13, the price for middling uplands on the Exchange dropped steadily until low for the period was reached. The spread of the theatre of war, breaks in other markets, foreign and domestic selling waves, stoppage of trading in Egypt—these were some of the factors contributing to the decline. War news more favorable to the Allies, plus the establishing of minimum prices on the Grain Exchange and the proximity of cotton prices to minimum Government loan values, brought the price back over the 10-cent level on May 24, 10.68, high for the period, being reached on May 27. Announcement of the Belgian capitulation broke the price again, and word that beginning May 30 no individual import licenses would be required by the British Board of Trade on all shipments of cotton other than those from the British and French Empires and Egypt, a move favoring Empire fiber, held it down. Quotations follow:

	May 9*	June 10*		
	Close	High	Low	Close
July	10.45	9.88	9.75	9.83
October	9.92	8.82	8.63	8.66
December	9.85	8.74	8.54	8.57

(*) New Contract.

Sheetings

48x40	36 in.	5.50	lb.	— @	.03⅜
40x40	36 in.	6.15	lb.	— @	.03⅜
40x36	36 in.	6.50	lb.	— @	.03¼
48x48	40 in.	2.50	lb.	— @	.07⅜
48x48	40 in.	2.85	lb.	— @	.06⅞
56x60	40 in.	3.60	lb.	— @	.06¾
48x44	40 in.	3.75	lb.	— @	.05⅜

Ducks

Enameling (single filling)	lb. .23½	@	.24½
Belting and Hose	lb. .26¼	@	—
Single filling, A grade	lb. .10½	@	.11½
Double filling	lb. .11½	@	.12½

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 Tons

FROM MAY 10 TO JUNE 10

Date		Spot	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Sales
May	10	24.00	23.50	22.31	22.11	21.79	21.47	21.22	21.17	21.12	21.05	20.99	20.93	20.93	——	686
	11	23.50	23.20	22.05	21.87	21.49	21.10	20.53	20.48	20.42	20.29	20.17	20.05	20.05	——	365
	12	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	13	23.43	23.10	21.73	21.55	21.08	20.61	20.09	20.02	19.95	19.85	19.76	19.66	19.66	——	351
	14	24.00	23.45	22.67	22.40	21.83	21.25	20.69	20.61	20.50	20.44	20.34	20.24	20.24	——	540
	15	23.75	23.00	22.59	22.28	21.57	20.80	20.26	20.16	20.05	19.97	19.87	19.77	19.77	——	431
	16	23.50	22.85	21.90	21.65	20.83	19.90	19.39	19.29	19.10	19.10	19.00	18.90	18.90	——	346
	17	22.75	22.15	20.97	20.70	19.86	19.00	18.69	18.59	18.50	18.30	18.20	18.10	18.05	——	438
	18	22.25	21.50	20.36	20.11	19.33	18.55	18.19	18.09	18.00	17.80	17.62	17.45	17.40	——	246
	19	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	20	22.00	21.25	20.67	20.40	19.46	18.50	18.01	17.91	17.75	17.62	17.53	17.45	17.40	——	183
	21	21.25	20.57	19.82	19.57	18.81	18.05	17.57	17.47	17.35	17.25	17.15	17.05	17.00	——	227
	22	20.75	20.10	19.31	19.04	18.34	17.60	17.25	17.15	17.05	16.95	16.85	16.75	16.70	——	208
	23	20.00	19.65	18.90	18.65	18.19	17.61	17.25	17.15	17.05	16.95	16.90	16.85	16.80	——	218
	24	20.25	19.82	19.12	18.85	18.33	17.80	17.65	17.55	17.45	17.35	17.25	17.15	17.10	——	205
	25	20.50	20.17	19.57	19.30	18.75	18.18	18.00	17.90	17.80	17.70	17.60	17.50	17.45	——	63
	26	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	27	20.75	20.46	19.81	19.55	18.97	18.38	18.20	18.10	18.00	17.90	17.80	17.70	17.65	——	150
	28	20.50	——	19.82	19.30	18.71	18.10	17.80	17.70	17.60	17.50	17.40	17.30	17.25	——	59
	29	20.50	——	20.00	19.55	18.95	18.36	18.10	18.00	17.90	17.80	17.70	17.60	17.55	——	51
	30	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	31	21.25	——	21.00	20.35	19.58	18.82	18.55	18.45	18.35	18.25	18.15	18.05	18.00	——	139
June	1	22.00	——	22.00	21.50	20.46	19.40	18.95	18.85	18.75	18.65	18.55	18.45	18.40	18.40	190
	2	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	3	21.50	——	21.50	21.10	20.18	19.23	18.90	18.80	18.68	18.55	18.40	18.25	18.18	18.18	106
	4	21.63	——	21.56	21.16	20.25	19.42	19.16	19.05	18.94	18.80	18.65	18.50	18.43	18.43	85
	5	21.37	——	21.25	20.85	20.00	19.15	18.80	18.69	18.58	18.44	18.29	18.14	18.07	18.07	109
	6	21.50	——	21.40	21.00	20.07	19.15	18.82	18.72	18.60	18.46	18.31	18.16	18.09	18.09	60
	7	21.63	——	21.56	21.16	20.29	19.40	18.90	18.79	18.68	18.50	18.41	18.32	18.25	18.25	83
	8	21.75	——	21.63	21.23	20.39	19.55	19.02	18.91	18.80	18.60	18.47	18.35	18.28	18.28	22
	9	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	10	22.37	——	22.37	21.90	21.00	20.10	19.45	19.25	19.05	18.80	18.65	18.55	18.47	18.47	160

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CHEMICAL MARKETS

New York, June 10, 1940
All Prices F.O.B. Works

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.24 @	.30
A-10	lb.	.31 @	.35
A-11	lb.	.52 @	.65
A-19	lb.	.52 @	.65
A-32	lb.	.70 @	.80
A-77	lb.	.42 @	.55
A-100	lb.	.42 @	.55
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	.55 @	.65
Butyl Zimate	lb.	2.50 @	—
Captax	lb.	.50 @	.57
Crylene	lb.	.55 @	.65
Di-Ortho-Tolyguanidine	lb.	.44 @	.46
Diphenylguanidine	lb.	.35 @	.36
El-Sixty	lb.	.50 @	.65
Ethyl Zimate	lb.	2.50 @	—
Ethylidene aniline	lb.	.42 @	.43
Formaldehyde aniline	lb.	.37½ @	.42
Guantal	lb.	.40 @	.50
Hepteen	lb.	.35 @	.40
Hexamethylenetetramine	lb.	.33 @	—
Lead Oleate, No. 999	lb.	.14 @	—
Witco		.15 @	—
Monex	lb.	— @	2.35
Phenex	lb.	.50 @	.55
Pip-Pip	lb.	2.50 @	—
Pipsolene	lb.	1.55 @	1.85
R & H 50-D	lb.	.42 @	.43
R-2	lb.	1.40 @	1.80
R-2 Crystals	lb.	2.50 @	2.75
R-21	lb.	.40 @	—
RN-2	lb.	1.40 @	1.80
RN-2 Crystals	lb.	2.00 @	2.25
Rotax	lb.	.60 @	.65
Safex	lb.	1.20 @	1.30
SPDX	lb.	.70 @	.75
Super-Sulphur No. 1	lb.	.50 @	—
No. 2	lb.	.18 @	.25
Thiocarbanilid, drums	lb.	.24 @	.30
Thiurad	lb.	— @	2.35
Trimene	lb.	.55 @	.65
base	lb.	1.05 @	1.20
Triphenylguanidine	lb.	.45 @	—
Tuads	lb.	2.35 @	—
Ulto	lb.	1.50 @	1.75
Ureka	lb.	.60 @	.75
Ureka Blend B	lb.	.60 @	.75
Ureka C	lb.	.56 @	.65
Vulcanex	lb.	.42 @	.43
Vulcanol	lb.	.85 @	—
Zimate	lb.	2.35 @	—
Inorganic			
Litharge, domestic	lb.	.07 @	.07½
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blacks (See Compounding Materials)

Blues			
Prussian	lb.	.36 @	.37
Ultramarine	lb.	.15 @	—
Browns			
Mapico	lb.	.13 @	—
Umber, Turkey	lb.	.04 @	.04½
Greens			
Chrome	lb.	.21 @	—
Guignet's Green	lb.	.70 @	—
Reds			
Antimony			
crimson, 15/17	lb.	.45 @	—
sulfur, free	lb.	.48 @	.60
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼ @	—
Whites			
Cryptone, No. 19	lb.	.05¼ @	.05½
Cryptone CB, No. 21	lb.	.05¼ @	.05½
Cryptone, ZS-230	lb.	.07½ @	.07¾
Cryptone, ZS-86	lb.	.07½ @	.07¾
Lithopone			
Albalith, black label—11	lb.	.03¾ @	.04
Azolith	lb.	.03¾ @	.04
Ray-bar	lb.	.05¼ @	.05¾
Ray-cal	lb.	.05¼ @	.05¾
Rayox	lb.	.13 @	.14
Titanox A	lb.	.13 @	.14
Titanox B	lb.	.05¼ @	.05¾
Titanox C	lb.	.05 @	.05½
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06¼ @	.06½
Anaconda, lead free	lb.	.06¼ @	.06½
Horsehead Lead Free Brand:			
Special—3	lb.	.06¼ @	.06½
XX Red—4	lb.	.06¼ @	.06½
XX Red—72	lb.	.06¼ @	.06½
XX Red—78	lb.	.06¼ @	.06½
XX Red—103	lb.	.06¼ @	.06½
Kadox, black label—15	lb.	.06½ @	.06¾
Blue label—16	lb.	.06½ @	.06¾
Red label—17	lb.	.06½ @	.06¾
St. Joe, black label	lb.	.06¼ @	.06½
green label	lb.	.06¼ @	.06½
red label	lb.	.06¼ @	.06½
U. S. P.—7, bbls.	lb.	.09½ @	.09¾
Zinc Oxide—French Process			
Florence White seal—7 bbls.	lb.	.08½ @	.08¾
Green seal—8	lb.	.08 @	.08¼
Red seal—9	lb.	.07½ @	.07¾
Yellows			
Cadmolith	lb.	.55 @	.65
Chrome	lb.	.14½ @	.15½
Mapico	lb.	.09½ @	—

BLACKS
(In bags, carload lots)

Aerfloted Arrow	lb.	.0265 @	—
Certified	lb.	.0265 @	—
Certified Spheron	lb.	.0265 @	—
Continental	lb.	.0265 @	—
Disperso	lb.	.0265 @	—
Excello	lb.	.0265 @	—
Fumonex	lb.	.03 @	—
Fumonex Beads	lb.	.03 @	—
Gastex	lb.	.03 @	—
Kosmobile	lb.	.0265 @	—
Kosmobile 66	lb.	.0265 @	—
Micronex (Amarillo)	lb.	.0265 @	—
Micronex Beads (Amarillo)	lb.	.0265 @	—
Pelletex	lb.	.03 @	—
P-33	lb.	.0475 @	—
Supreme	lb.	.0265 @	—
Thermax	lb.	.02 @	—
Wyex	lb.	.0265 @	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85 @	24.50
Asbestine	ton	13.00 @	15.00
Barium carbonate (98-100%)	ton	— @	—
Barytes	ton	23.65 @	31.15
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	60.00 @	65.00
Calcene	ton	37.50 @	45.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	45.40 @	60.00
heavy	ton	45.00 @	55.00
Clay, Aerfloted, Suprex	ton	10.00 @	22.00
Crown (f.o.b. plant)	ton	10.00 @	—
Dixie	ton	10.00 @	24.50
Langford	ton	— @	8.50
McNamee	ton	10.00 @	22.50
Par	ton	10.00 @	22.50
Witco	ton	10.00 @	—
Cotton Flock (Dark)	lb.	.10½ @	.13
Kalite No. 1	ton	24.00 @	50.00
Kalite No. 3	ton	34.00 @	60.00
Kalvan	ton	95.00 @	121.00
Magnesium carbonate	lb.	.07½ @	—
Mica	ton	35.00 @	44.00
Mineralite	ton	— @	30.00
Pyrax A	ton	6.00 @	20.00
Rottenstone (powdered)	lb.	.02½ @	.05
Silene (calcium silicate)	lb.	.04 @	.045
Soapstone, powdered	ton	16.00 @	22.00
Starch, powdered	cwt.	2.90 @	4.10
Talc, domestic	ton	25.00 @	45.00
Whiting, commercial	ton	17.00 @	18.00
Columbia Filler	ton	9.00 @	14.00
English Cliffstone	ton	33.00 @	43.00
Witco	ton	6.00 @	—
Wood Flour	ton	20.00 @	25.00
Zinc Carbonate	lb.	— @	—
Zinc Stearate	lb.	— @	—

MINERAL RUBBER

285°-300° Mineral Rubber	ton	23.00 @	42.00
Black Diamond	ton	25.00 @	—
Genasco, solid (factory)	ton	25.00 @	27.00
Hard Hydrocarbon	ton	23.00 @	42.00
Parmr, solid	ton	21.00 @	27.00
Pioneer, MR, solid	ton		

MISCELLANEOUS

Aromatics—Rodo #0	lb.	3.50 @	4.00
Rodo #10	lb.	4.50 @	5.00
Curodex 19	lb.	2.75 @	—
Curodex 188	lb.	3.50 @	—
Curodex 198	lb.	4.50 @	—
Para-Dor No. 3145	lb.	2.00 @	—
Aresklene No. 375 (dispersing, wetting and penetrating agent)	lb.	.35 @	.50
Darvan (dispersing agent)	lb.	.30 @	.47
Santomerse S (dispersing, wetting, penetrating and stabilizing agent)	lb.	.11 @	.25
Sunproof	lb.	.22 @	.27
Sponge Paste	lb.	— @	.18
Tackol (tackifier)	lb.	.085 @	.18
Tonox	lb.	.52 @	.61
Ty-Ply R (and S)	gal.	6.75 @	10.75
Unicel (blowing agent)	lb.	.50 @	—

SOFTENERS

Acids			
Acetic, 28%, bbls.	100 lb.	2.53 @	2.78
Nitric, 36 degrees	cwt.	5.00 @	6.00
Sulfuric, 66 degrees	ton	15.50 @	16.50
Acids, Fatty			
Laurex	lb.	.10¾ @	.13¼
SL #10	lb.	.12 @	.14
Stearex Beads	lb.	.08 @	.09
Stearic, double pressed	lb.	.12½ @	.13½
Stearite	lb.	.10½ @	—
Alkalies			
Caustic Soda, 76%	cwt.	2.70 @	3.55
Soda Ash, 58%, C.L.	cwt.	— @	2.35
Oils			
Cycline Oil	gal.	.14 @	.20
Degras, bbls.	lb.	.07¾ @	.08
Fluxrite	lb.	.05½ @	.06½
Para-Flux	gal.	.17 @	.18
Para-Lube	lb.	.046 @	.048
Petrolatum, light	lb.	.03½ @	.03¾
Pigmentaroil, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
Pine, steam distilled	gal.	.64 @	.69
Rosin Oil, cmpd	gal.	.40 @	—
Rubberol, f.o.b. Chicago	lb.	.13½ @	.14
Rubtack	lb.	.08 @	.10
Seedine, c.l.		.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	.07 @	—
Witco Softener No. 20	gal.	.20 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.05½ @	.06½
coal tar	ton	19.00 @	22.00
hardwood	ton	16.00 @	22.50
pine, 200 lb. gr. wt.	bbl.	6.00 @	6.50
Pigmentar, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums	ton	20.00 @	26.00
Solvents			
Acetone, pure	lb.	— @	—
Benzene, 90%	gal.	.18 @	.23
Beta-Trichlorethane	gal.	— @	.20
Bondogen	lb.	.98 @	1.50
Carbon, bisulfide	lb.	.05¼ @	.08
Carbon tetrachloride	gal.	.73 @	1.065
Dichlorethylene	lb.	— @	—
Dipentene, cml., drums	gal.	.41 @	.50
Ethylene dichloride	lb.	.06 @	.07
Plastogen	lb.	.07¼ @	.12
Reogen (drums)	lb.	.11½ @	.26
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Trichlorethylene	lb.	— @	.08½
Turpentine, spirits	gal.	.43 @	.47
dest. dist., drums	gal.	.33 @	.41
Waxes			
Beeswax, white	lb.	.39 @	.45
Carnauba, yellow	lb.	.46 @	.47½
Ceresin, white, dom.	lb.	.08 @	.11
Montan, crude	lb.	.10¾ @	.11¾
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.02¾ @	—
Refined, 122/127	lb.	.04½ @	—

ANTI-OXIDANTS

Agerite Alba	lb.	1.50 @	1.95
Exel	lb.	1.00 @	1.40
Gel	lb.	.57 @	.73
Hipar	lb.	.65 @	.92
Powder	lb.	.52 @	.64
Resin	lb.	.52 @	.64
Resin D	lb.	.52 @	.64
White	lb.	1.25 @	1.60
Albasan	lb.	.70 @	.75
Antox	lb.	— @	.56
B-L-E	lb.	.52 @	.61
Flectol B	lb.	.52 @	.65
Flectol H	lb.	.52 @	.65
Flectol White	lb.	.90 @	1.15
Neozone	lb.	.52 @	.63
Oxynone	lb.	.64 @	.80
Retardex	lb.	.35 @	.40
Santoflex B	lb.	.52 @	.65
Santovar A	lb.	1.15 @	1.40
S.C.R.	lb.	.33 @	.35
Stabilite	lb.	.52 @	.54
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.52 @	.61

MOLD LUBRICANTS

Aresklene	lb.	.35 @	.50
Cocoa Soapstone	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Lubrex	lb.	.25 @	.30
Mineralite	ton	— @	30.00
Mold Paste	lb.	.12 @	.18
Rubberol, f.o.b. Chicago	lb.	.13½ @	.14
Sericite, f.o.b. N. Y.	ton	65.00 @	—
Soap Tree Bark, cut, sifted	lb.	.06 @	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.17 @	—
Black	lb.	.08 @	.12
White	lb.	.08½ @	.12
Brown	lb.	.08 @	.10½
Neophax	lb.	.09¼ @	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.07½ @	.15
Sulfur Chloride, yellow (drs.)	lb.	.04 @	—
Sulfur flour,			
Refined, 100% pure (bags)	cwt.	2.50 @	3.65
Commercial (bags)	cwt.	1.60 @	2.35
Telloy	lb.	1.75 @	—
Vandex	lb.	1.75 @	—

STATISTICS

Crude Rubber — Latex & Guayule — Reclaim — Tires & Tubes — Automobiles — Rims — Gasoline — Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1924	325,899	173,367,272	23.75	10,309	6,057,637	26.23	315,590
1925	393,370	426,167,504	48.36	14,827	19,847,753	59.76	378,543
1926	409,944	501,131,064	54.57	17,671	22,470,583	56.77	392,273
1927	424,733	338,688,492	35.60	27,775	24,735,488	39.76	396,958
1928	432,633	242,727,423	25.05	32,159	18,128,761	25.17	400,474
1929	560,082	239,177,811	19.06	36,485	16,868,718	20.64	523,597
1930	482,083	139,133,048	12.88	30,205	9,310,205	13.76	451,878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471,581
1932	409,556	31,936,459	3.48	20,930	2,015,612	4.30	388,626
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	387,280
1934	449,513	97,929,676	9.73	23,848	5,770,109	10.80	425,665
1935	453,134	115,299,448	11.36	11,389	3,084,331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4,488,223	15.93	454,483
1937	574,600	237,307,041	18.44	7,902	3,385,433	19.02	566,698
1938	397,620	125,357,730	14.07	5,652	1,799,124	14.21	391,968
1939	469,803	167,558,245	15.92	13,125	5,832,618	19.84	456,678
1939:							
Mar.	43,490	15,058,279	15.46	439	171,279	17.43	43,051
Apr.	30,836	10,400,125	15.06	440	151,644	15.38	30,396
May	42,998	15,041,433	15.62	496	180,091	16.20	42,502
June	32,437	11,403,150	15.69	413	147,910	16.00	32,024
July	34,288	12,071,105	15.72	440	164,428	16.69	33,848
Aug.	35,794	12,702,958	15.84	267	89,741	15.01	35,527
Sept.	35,006	12,667,740	16.16	1,472	659,055	19.98	33,534
Oct.	42,784	15,211,621	15.87	5,886	2,881,172	21.85	36,898
Nov.	39,422	14,555,150	16.48	1,228	539,763	19.63	38,194
Dec.	68,384	25,861,354	16.88	1,116	529,759	21.20	67,268
1940:							
Jan.	68,962	26,314,500	17.03	955	447,673	20.92	68,007
Feb.	40,603	15,578,517	17.13	1,291	599,819	20.74	39,312
Mar.	55,517	21,845,290	17.57	975	447,460	20.49	54,542
April	66,622	26,176,442	17.54	565	252,638	19.98	66,057

Note: "Gross Imports" do not include latex or guayule. To secure more accurate figures for "Net Imports" latex and guayule figures (shown below) should be added and the re-export figure deducted from the total. Annual figures for 1922, however, include both latex and guayule; guayule only is included in 1923. Annual figures for 1922-36 were revised in February, 1937.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,272	3,537,510
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,394	4,686,743
1927	5,018	2,674,957	582	477,246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755,685	731	430,855	7,552	2,540,059	4,007	2,121,786
1929	1,275	545,175	728	566,964	8,204	2,458,126	3,729	1,788,391
1930	1,096	347,388	502	422,684	5,907	1,403,244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888,909
1932	....	.....	707	147,403	4,607	616,596	5,112	601,999
1933	....	.....	1,659	2,261,869	5,990	944,895	11,085	1,833,671
1934	398	75,349	1,054	438,209	4,987	943,752	13,107	3,643,221
1935	459	86,835	615	188,384	5,644	1,063,126	13,553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19,852	6,659,899
1937	2,694	745,873	354	151,344	7,109	2,017,786	23,185	10,213,670
1938	2,485	623,819	509	181,140	9,132	2,944,504	11,878	4,147,318
1939	2,232	463,345	694	265,553	6,640	1,603,418	27,438	10,467,552
1939:								
Mar.	229	39,520	14	5,215	641	136,112	2,005	731,302
Apr.	180	24,584	59	18,170	281	72,024	1,018	360,739
May	102	22,347	56	16,359	645	161,745	2,786	1,067,682
June	91	19,879	119	33,876	597	122,087	1,836	694,863
July	150	32,626	39	18,813	663	141,540	2,934	1,064,927
Aug.	178	38,687	28	8,689	742	208,156	2,614	1,001,013
Sept.	133	30,091	36	19,682	479	100,285	2,525	965,615
Oct.	282	61,376	107	43,267	465	127,084	2,555	968,207
Nov.	214	46,558	96	37,858	289	74,358	3,071	1,227,788
Dec.	236	51,521	64	38,781	477	126,548	2,779	1,127,924
1940:								
Jan.	128	27,901	34	19,478	612	155,570	3,410	1,412,728
Feb.	314	70,251	55	26,420	461	134,878	2,171	947,524
Mar.	365	81,181	45	20,895	542	162,493	3,376	1,473,056
April	314	65,313	50	18,289	506	176,064	3,763	1,608,156

(1) Weight given in pounds of dry rubber contained in latex.

Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

Figures on Monthly Basis

	1933	1934	1935	1936	1937	1938	1939	1940
Jan.	22,645	39,190	46,636	48,631	50,879	31,265	47,387	54,978
Feb.	21,392	40,515	42,720	36,841	51,950	25,357	43,422	49,832
Mar.	17,843	47,003	42,153	42,813	54,129	32,389	51,416	50,192
Apr.	25,928	44,853	44,247	52,031	51,859	29,730	45,268	50,103
May	44,074	42,918	41,101	50,612	51,795	30,753	45,484	.....
June	50,743	40,147	36,156	52,772	51,860	32,540	48,438	.....
July	49,614	32,553	35,917	48,250	43,703	34,219	44,975	.....
Aug.	44,428	33,216	38,775	46,777	41,506	40,552	51,740	.....
Sept.	35,281	30,258	37,086	46,449	43,945	40,183	51,402	.....
Oct.	31,543	31,253	41,969	49,637	38,754	42,850	57,155	.....
Nov.	28,831	34,748	42,310	50,433	34,025	49,050	55,677	.....
Dec.	28,757	36,569	42,474	49,754	29,195	48,143	49,636	.....
Tot.	401,079	453,223	491,544	575,000	543,600	437,031	592,000	.....

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks	Year	Production	Consumption Tons	Consumption % to Crude	Stocks
1930	157,968	153,500	40.9	22,000	1935	122,948	117,523	23.9	17,000
1931	129,690	123,000	35.1	21,714	1936	150,571	141,486	24.6	19,000
1932	75,656	77,500	23.3	16,334	1937	185,033	162,000	29.8	28,800
1933	93,587	85,000	21.2	17,780	1938	122,400	120,800	29.9	23,000
1934	108,162	100,855	22.3	20,000	1939	186,000	170,000	28.7	25,250

Figures on Monthly Basis

1939:*									
Jan.	14,826	13,743	29.7	23,334	July	12,588	13,542	30.9	21,339
Feb.	14,102	13,347	31.5	23,461	Aug.	17,595	16,846	33.4	21,024
Mar.	15,647	16,197	32.3	22,155	Sept.	17,990	16,953	33.8	21,185
Apr.	14,527	13,391	30.3	22,628	Oct.	20,896	18,955	34.0	21,829
May	14,769	13,517	30.5	22,771	Nov.	20,755	18,006	33.2	22,362
June	15,871	14,870	31.4	23,058	Dec.	19,249	15,575	32.2	25,427
1940:									
Jan.	20,447	17,596	32.0	25,530	July	.....	.....	...	.....
Feb.	19,060	17,019	34.2	27,019	Aug.	.....	.....	...	.....
Mar.	18,266	17,560	35.0	26,221	Sept.	.....	.....	...	.....
Apr.	16,568	16,298	32.5	27,558	Oct.	.....	.....	...	.....
May	.....	.....	...	.....	Nov.	.....	.....	...	.....
June	.....	.....	...	.....	Dec.	.....	.....	...	.....

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures. The annual figures are more accurate. Stocks shown are those on hand at the end of the indicated month or year.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)

(In Thousands of Barrels of 42 Gallons)

	1938	1939	1940		1938	1939	1940
January	35,323	37,767*	40,370	August	50,549	53,828*	.....
February	31,981	34,595	37,557	September	46,150	49,347	.....
March	41,409	42,520	44,607	October	46,365	49,687	.....
April	43,430	43,977	47,683	November	45,084	47,275	.....
May	44,937	49,547	.....	December	41,742	43,694	.....
June	48,383	49,812	.....				
July	47,650	50,508	.....	Total	523,003	552,557*	.....

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1928	24,247,282	1932	6,261,336	1936	20,790,192
1929	24,141,502	1933	8,713,962	1937	22,257,964
1930	17,364,096	1934	12,255,118	1938	10,612,138
1931	11,253,800	1935	18,664,356	1939	17,471,914

1940		1940		1940	
January ...	2,163,914	May	1,743,786	September ..	.....
February ..	1,850,383	June	.....	October ...	.....
March	1,918,241	July	.....	November ..	.....
April	1,822,686	August	.....	December ..	.....

ADVERTISING PAGES REMOVED

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1938																																
Mar.	14⅞	14⅛	14⅛	14½	14⅜	—	14⅜	14⅝	14⅝	14⅝	14⅝	14	13⅞	14	14⅜	—	—	13⅛	13⅛	—	13⅜	13⅜	13⅛	13⅛	12⅝	12⅝	—	12⅝	11⅝	10⅝	10⅜	13⅜
April	10⅞	11⅛	11⅜	11⅝	11	11⅜	11⅛	11⅜	11⅛	11⅜	11⅜	12⅛	12⅛	12⅜	—	11⅜	11⅜	11⅜	12⅜	12⅛	12⅛	12⅜	12⅜	12⅜	12⅛	11⅞	11⅜	11⅜	11⅜	11⅝	—	11⅜
May	—	11⅜	11⅝	11⅜	11⅜	11⅜	11⅜	11⅜	12⅛	12	12	12⅛	12⅜	11⅜	12⅜	12⅛	11⅜	12⅛	11⅞	11⅞	11⅞	12⅛	13⅜	13⅜	13⅜	13⅜	14⅛	14⅛	14⅛	14⅛	—	12½
June	11⅜	11⅞	11⅝	14⅜	16	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	15⅞	15⅞	15⅞	15⅞	16⅞	16⅞	15⅞	15⅞	16⅛	15⅞	16⅜	16⅜	16⅜	16⅜	15⅞	16⅜	16⅜	16⅜	16⅜	16⅜	15⅞
July	15¼	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛
August	15⅛	15⅛	15⅛	15⅛	16	16⅛	16⅛	16⅛	16⅛	16⅛	15⅞	15⅞	15⅞	15⅞	15⅞	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛
Sept.	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛
Oct.	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛
Nov.	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛
Dec.	15⅞	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛
1939																																
Jan.	—	—	16⅛	16⅛	16	16	—	—	—	16	15⅛	15⅞	15⅛	15⅜	15⅜	15⅜	15⅜	15⅛	15⅛	15⅛	15⅜	15⅜	15⅜	15⅜	15⅜	14⅛	15⅛	15⅛	15⅛	15⅛	15⅜	15⅜
Feb.	15⅜	15⅜	15⅜	15⅜	—	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	—	16⅛	16⅛	—	—	15⅜	16⅛	16⅛	16⅛	16⅛	16⅛	—	—	16
March	16⅛	16⅛	16⅛	15⅜	16⅛	16⅛	15⅞	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16	16⅛	16⅛	16⅛	16⅛	16⅛	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
April	—	—	—	15⅜	16	16	—	—	—	—	—	—	15⅜	15⅜	15⅜	16	16	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
May	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
June	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
July	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
August	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
September	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
October	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
November	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
December	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
1940																																
January	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	—	—	19⅜	19⅜	19⅜	19⅜	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	—	—	19⅛	—	—	—	—	—	—	—	—	18⅜	19
February	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	19⅜	19⅜	19⅜	18⅜	18⅜	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	18⅜	18⅜	—	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜
March	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜
April	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜
May	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜
June	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜

ADVERTISING PAGES REMOVED

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Markets)

Average Price per Pound for Years 1913-1932

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.59
1914	65.33	1918	60.15	1922	17.50	1926	48.50	1930	11.98
1915	65.85	1919	48.70	1923	29.45	1927	37.72	1931	6.17
1916	72.50	1920	36.30	1924	26.20	1928	22.48	1932	3.49

Average Monthly Price per Pound Since 1933

	1933 Cents	1934 Cents	1935 Cents	1936 Cents	1937 Cents	1938 Cents	1939 Cents	1940 Cents
Jan.	3.08	9.32	13.10	14.35	21.37	14.63	15.75	19.06
Feb.	2.95	10.45	12.92	15.48	21.33	14.71	15.93	18.83
Mar.	3.01	11.01	11.51	15.89	24.09	13.55	16.26	18.58
Apr.	3.56	12.10	11.55	15.98	23.44	11.84	15.87	19.16
May	4.95	13.26	12.05	15.62	21.14	11.57	16.07	21.21
June	6.15	13.51	12.57	15.85	19.29	12.57	16.37	
July	8.01	14.60	12.10	16.49	18.86	15.37	16.51	
Aug.	7.31	15.47	11.98	16.25	18.37	16.08	16.67	
Sept.	7.30	15.36	11.55	16.46	18.55	16.15	21.24	
Oct.	7.64	13.96	12.62	16.55	16.28	16.89	19.89	
Nov.	8.66	13.04	13.15	17.97	14.60	16.24	20.21	
Dec.	8.87	12.98	13.28	20.01	15.41	16.05	20.01	
Average for Year	5.96	12.92	12.37	16.41	19.39	14.64	17.57	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1940 Mar.	1940 Apr.	1940 May	1940 June	Day	1940 Mar.	1940 Apr.	1940 May	1940 June
1	12 7/16	11 7/16	11	—	17	—	11	11 13/16	
2	—	11 7/16	11 1/16	—	18	11 7/16	11	—	
3	—	11	11 1/4	12 1/16	19	11 7/16	11	—	
4	12 3/16	10 15/16	—	12 1/16	20	11 7/16	—	11 3/4	
5	12 1/4	10 15/16	—	12 1/4	21	11 1/4	—	11 11/16	
6	12 1/4	—	11 1/16	12 1/4	22	—	10 15/16	11 7/16	
7	12 1/4	—	11 1/16	12 3/16	23	—	11	11 7/16	
8	12 1/8	10 15/16	11 1/2	—	24	—	10 15/16	11 1/2	
9	—	11 1/8	11 1/2	—	25	—	10 15/16	—	
10	—	11 1/16	12 1/8	12 5/16	26	11 1/4	10 15/16	—	
11	12 1/8	11	—		27	11 1/16	—	11 7/16	
12	12	11	—		28	11 1/8	—	11 7/16	
13	11 3/4	—	11 7/16		29	11 1/16	10 7/8	11 5/16	
14	11 3/8	—	11 3/8		30	—	10 7/8	11 7/16	
15	11 1/8	10 15/16	11 7/16		31	—	—	11 3/8	
16	—	10 15/16	11 3/8						

Average Monthly Price Per Pound

Month	1937 Pence	1938 Pence	1939 Pence	1940 Pence	Month	1937 Pence	1938 Pence	1939 Pence	1940 Pence
Jan.	10.378	7.077	7.926	11.793	Aug.	8.830	7.841	8.545	
Feb.	10.503	7.029	7.942	12.577	Sept.	8.935	7.918	9.634	
Mar.	11.766	6.590	8.120	11.651	Oct.	7.855	8.355	10.177	
Apr.	11.471	5.793	7.910	10.980	Nov.	7.080	8.111	11.210	
May	10.250	5.632	8.002	11.600	Dec.	7.332	8.005	11.559	
June	9.548	6.147	8.216		Average for Year.	9.424	7.164	8.959	
July	9.136	7.464	8.271						

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1940 Apr.	1940 May	1940 June	Date	1940 Apr.	1940 May	1940 June	Date	1940 Apr.	1940 May	1940 June
1	10.74	10.96	10.21	11	10.88	10.45		22	10.96	9.96	
2	10.73	10.93	—	12	10.89	—		23	10.99	9.99	
3	10.85	10.86	10.12	13	10.89	10.48		24	10.84	10.37	
4	10.84	10.84	10.13	14	—	9.98		25	10.89	10.41	
5	10.85	—	10.18	15	10.89	9.75		26	10.93	—	
6	10.84	10.74	10.31	16	10.94	9.86		27	10.98	10.68	
7	—	10.69	10.56	17	10.90	9.72		28	—	10.39	
8	10.88	10.67	10.43	18	10.91	9.46		29	10.94	10.43	
9	10.93	10.73	—	19	10.87	—		30	10.99	—	
10	10.92	10.32	10.42	20	10.91	9.91		31	—	10.21	
				21	—	9.76					

Average Monthly Price Per Pound

	1937 Cents	1938 Cents	1939 Cents	1940 Cents		1937 Cents	1938 Cents	1939 Cents	1940 Cents
Jan.	13.06	8.57	8.94	11.19	Aug.	10.41	8.41	9.30	
Feb.	13.15	8.91	8.97	11.10	Sept.	9.02	8.17	9.30	
Mar.	14.46	8.92	9.00	10.90	Oct.	8.42	8.61	9.24	
Apr.	14.23	8.76	8.87	10.89	Nov.	7.96	9.08	9.73	
May	13.34	8.50	9.56	10.33	Dec.	8.26	8.72	10.97	
June	12.70	8.38	9.88		Average for Year	11.44	8.66	9.46	
July	12.26	8.85	9.71						

Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

End of:	ON HAND 1938	ON HAND 1939	ON HAND 1940	AFLOAT 1938	AFLOAT 1939	AFLOAT 1940	ON HAND AND AFLOAT 1938	ON HAND AND AFLOAT 1939	ON HAND AND AFLOAT 1940
Jan.	276,497	220,727	142,368	57,356	48,210	90,285	333,853	268,937	232,653
Feb.	292,067	207,882	134,328	47,459	55,814	112,257	339,526	263,696	246,585
Mar.	301,762	201,752	142,414	41,882	55,981	113,619	343,644	257,733	256,033
Apr.	303,901	188,074	162,282	39,071	57,918	102,557	342,972	245,992	264,839
May	300,907	187,980		32,859	54,046		333,766	242,026	
June	294,796	173,493		32,079	51,274		326,875	224,767	
July	282,785	165,450		40,400	52,990		323,185	218,440	
Aug.	273,841	152,029		47,772	66,717		321,613	218,746	
Sept.	268,094	136,824		48,927	68,310		317,021	205,134	
Oct.	259,074	119,404		51,062	100,500		310,136	219,904	
Nov.	242,592	105,205		51,114	114,044		293,706	219,249	
Dec.	231,500	125,800		45,105	91,095		276,605	216,895	

STOCKS IN GREAT BRITAIN

(No. of Tons in Wharves and Warehouses, not including Latex)

At end of	London 1938	London 1939	London 1940	Liverpool 1938	Liverpool 1939	Liverpool 1940
January	40,203	51,420	12,000*	21,711	28,789	8,000*
February	46,596	48,312	10,000*	24,737	26,784	7,000*
March	50,233	46,768	10,000*	26,220	24,996	8,000*
April	54,296	44,760	12,000*	28,277	23,742	10,000*
May	57,194	43,454		29,862	22,211	
June	60,307	42,374		31,837	21,176	
July	62,236	37,772		32,825	19,116	
August	65,113	28,363		34,315	16,218	
September	63,321	24,965*		34,645	14,054*	
October	59,609	23,685*		33,483	13,336*	
November	57,794	23,244*		32,116	13,087*	
December	55,668	19,545*		31,012	11,006*	

* Estimated.

(Figures up to August, 1939, from the Rubber Trade Association of London)

STOCKS IN OTHER CENTRES

(Figures from Statistical Bulletin of the Int'l Rubber Regulation Committee)

	Penang and Singapore [1]	Malaya [2]	Ceylon [2]	Holland	Para and Manaos
At end of 1939					
January	**30,975**	**59,155**	**4,827**	**198**	**1,557**
February	**28,559**	**59,399**	**4,318**	**183**	**1,826**
March	**23,255**	**58,005**	**3,389**	**137**	**2,244***
April	**22,434**	**55,238**	**3,648**	**131**	**2,209**
May	20,849	52,837*	4,005	136	1,966
June	19,563*	55,834	3,771	101	1,821
July	27,042	55,948	4,217	188	1,474
August	20,543*	50,625	3,134	315	1,914
September	23,457*	52,755	2,742	...	2,682
October	25,376*	46,264	3,335	...	3,419
November	22,957*	45,133	5,289	...	4,510
December	15,299*	54,868	5,149	...	5,336
At end of 1940					
January	35,928	60,504	5,755	...	2,862
February	33,608	52,615	4,452	...	2,869
March	23,874	48,180	3,369	...	3,246

[1] Dealers' and Port Stocks. [2] Inside Regulated Areas. [3] Dealers' Stocks Only. * Revised.

RUBBER STOCKS AFLOAT

End of: 1939	Afloat for United States	Afloat for Europe	All Other * Afloat	Total * Afloat
April	**57,918**	**27,200**	**13,882**	**99,000**
May	**54,046**	**25,700**	**16,254**	**96,000**
June	51,274	25,260	11,466	88,000
July	52,990	31,000	21,010	105,000
August	66,717	30,000	23,283	120,000
September	68,310	30,000	35,690	134,000
October	100,500	35,000	37,500	173,000
November	114,044	35,000	21,956	171,000
December	91,095	35,000	25,905	152,000
End of: 1940				
January	90,285	35,000	49,715	175,000
February	112,257	40,000	40,743	193,000
March	113,619	40,000	57,381	211,000
April	102,557	45,000	40,443	188,000

* *Total Afloat* is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.

TOTAL PRINCIPAL WORLD STOCKS

(Figures from the Survey of Current Business)

At End of:	1935	1936	1937*	1938*	1939	1940
January	698,153	600,479	454,249	549,762	497,665	433,841
February	686,195	599,355	445,265	565,833	479,578	429,551
March	678,809	583,318	447,856	586,666	460,723	447,472
April	677,006	567,172	428,249	586,291	438,252	465,345
May	677,569	541,871	413,134	568,158	429,979	.....
June	671,525	520,255	434,250	573,136	407,640	.....
July	679,061	519,074	445,782	580,654	418,639	.....
August	680,644	500,520	457,462	565,394	397,345	.....
September	661,509	493,585	470,768	551,447	396,867	.....
October	655,000	486,159	479,398	540,976	413,274*	.....
November	617,300	466,491	493,266	512,196	395,217	.....
December	613,987	466,576	545,533	482,852	391,125	.....
Monthly Avge.	666,397	528,738	460,022	555,280	427,192	.....

* Revised.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Production Figures on Quarterly Basis

Quarter	1933	1934	1935	1936	1937	1938	1939	1940
Jan.-Mar.	6,635	13,437	13,355	11,376	15,565	7,314	13,946	14,849
Apr.-June	14,412	13,565	12,597	14,892	15,834	7,380	13,759	.....
July-Sept.	14,707	9,822	11,312	14,914	12,207	10,794	15,182	.....
Oct.-Dec.	9,550	10,406	12,099	14,858	9,704	12,360	14,726	.....
Total	45,304	47,230	49,363	56,040	53,310	37,848	57,613	.....

Shipment Figures on Quarterly Basis

Quarter	1933	1934	1935	1936	1937	1938	1939	1940
Jan.-Mar.	6,981	10,730	11,154	10,554	14,143	7,388	12,445	12,728
Apr.-June	15,139	14,998	13,473	15,940	15,741	9,564	15,107	.....
July-Sept.	13,707	11,648	13,489	14,037	13,106	11,243	15,791	.....
Oct.-Dec.	8,265	9,310	12,066	12,855	10,495	12,098	14,165	.....
Total	44,092	46,686	50,182	53,386	53,485	40,293	57,508	.....

Inventory Figures [2]

Quarter	1933	1934	1935	1936	1937	1938	1939	1940
Jan.-Mar.	7,290	11,651	11,675	8,762	12,004	10,547	9,963	10,747
Apr.-June	6,615	10,219	10,755	7,556	12,081	8,337	8,632	.....
July-Sept.	7,595	8,419	8,288	8,690	11,200	7,859	8,080	.....
Oct.-Dec.	8,888	9,455	8,196	10,717	10,383	8,166	8,665	.....

Figures for Recent Months

	PRODUCTION 1938	PRODUCTION 1939	PRODUCTION 1940	SHIPMENTS 1938	SHIPMENTS 1939	SHIPMENTS 1940	INVENTORY [2] 1938	INVENTORY [2] 1939	INVENTORY [2] 1940
Apr.	2,706	4,310	5,106	3,211	4,458	5,010	10,141	9,813	10,881
May	2,711	4,473		3,346	4,800		9,521	9,540	
June	3,091	4,976		3,979	5,849		8,470	8,632	

AUTOMOBILE INNER TUBES

Production Figures on Quarterly Basis

Quarter	1933	1934	1935	1936	1937	1938	1939	1940
Jan.Mar.	6,230	12,823	12,553	11,891	15,831	7,314	12,383	12,897
Apr.-June	13,001	13,191	11,631	14,624	15,413	7,380	11,847	.....
July-Sept.	14,356	10,321	11,270	15,320	12,038	10,794	13,118	.....
Oct.-Dec.	9,000	9,891	12,425	15,201	9,092	12,360	13,300	.....
Total	42,587	46,226	47,879	57,036	52,374	37,848	50,648	.....

Shipment Figures on Quarterly Basis

Quarter	1933	1934	1935	1936	1937	1938	1939	1940
Jan.-Mar.	6,539	10,640	11,252	11,367	14,606	7,387	11,422	11,750
Apr.-June	13,292	14,553	11,928	15,113	15,495	9,564	13,010	.....
July-Sept.	13,370	11,545	13,251	15,069	12,901	11,243	13,449	.....
Oct.-Dec.	8,189	8,306	11,636	12,874	9,765	12,099	13,309	.....
Total	41,390	45,044	48,067	54,423	52,767	40,293	51,190	.....

Inventory Figures [2]

Quarter	1933	1934	1935	1936	1937	1938	1939	1940
Jan.-Mar.	6,369	10,244	10,406	8,660	11,993	10,547	8,752	8,183
Apr.-June	6,097	8,795	10,050	8,075	11,833	8,337	7,549	.....
July-Sept.	7,008	7,639	7,565	8,595	11,326	7,859	7,206	.....
Oct.-Dec.	7,815	9,180	8,231	10,945	10,312	8,166	7,036	.....

Figures for Recent Months

	PRODUCTION 1938	PRODUCTION 1939	PRODUCTION 1940	SHIPMENTS 1938	SHIPMENTS 1939	SHIPMENTS 1940	INVENTORY [2] 1938	INVENTORY [2] 1939	INVENTORY [2] 1940
Apr.	2,258	3,852	4,618	2,860	3,940	4,543	9,917	8,653	8,258
May	2,325	3,746		2,974	4,034		9,265	8,373	
June	2,797	4,249		3,730	5,036		8,337	7,549	

[1] These figures are based on reports received from the Rubber Manufacturers Association. They are revised frequently and the latest available issue should be consulted for most reliable figures.
[2] Stocks held by manufacturers at end of period indicated.

Automobile Production

Year	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936	4,454,115	3,669,528	784,587	162,159	128,369	33,790	4,616,274
1937	4,808,974	3,915,889	893,085	207,463	153,046	54,417	5,016,437
1938	2,489,085	2,000,985	488,100	166,086	123,761	42,325	2,655,171
1939*	3,577,292	2,866,796	710,496	155,316	108,806	46,510	3,732,608
1939							
Oct.*	313,392	251,819	61,573	11,296	7,791	3,505	324,688
Nov.*	351,785	285,252	66,533	16,756	9,882	6,874	368,541
Dec.*	452,142	373,804	78,338	16,978	11,491	5,487	469,120
1940							
Jan.*	432,279	362,897	69,382	17,213	12,579	4,634	449,492
Feb.*	404,032	337,756	66,276	18,193	12,779	5,414	422,225
Mar.*	423,620	352,922	70,698	16,612	12,025	4,587	440,232
Apr.	432,746	362,139	70,607	19,687	13,487	6,200	452,433
May	.....	.....	.....	.....	.....	.....	.....
June	.....	.....	.....	.....	.....	.....	.....

* Revised.
Note: U. S. figures represent factory sales: Canadian figures represent production.

ADVERTISING PAGES REMOVED

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]							NETHERLAND INDIES [4]							
	Gross Exports	Imports	Net Exports	Ceylon [2]	India & Burma [3]	Sarawak [3]	British North Borneo [3]	Thailand [3]	Java & Madura	Sumatra E. Coast	Other N. I.	Indo-China [3]	Amazon Valley	All Other [5]	World Total [6]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,135	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,536
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	374,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1934	677,361	211,803	465,558	79,746	10,492	17,233	11,103	17,545	87,400	112,058	173,470	20,170	8,903	2,985	1,008,663
1935	590,319	174,652	415,667	54,316	13,968	19,465	8,885	28,327	57,488	78,325	139,297	28,816	11,275	8,745	864,574
1936	520,286	167,799	352,487	49 692	14,724	21,243	8,177	33,702	61,307	84,577	152,205	40,782	14,193	11,466	845,431
1937	681,638	213,446	468,192	70,353	17,015	25,922	13,213	5,551	84,085	139,632	207,863	43,399	15,576	13,063	1,133,864
1938	526,911	156,101	370,810	49,528	15,178	17,792	9,512	41,080	57,526	94,561	145,909	58,518	14,618	12,920	887,892
1939	553,324	177,851	375,473	61,026	15,881	24,014	11,864	41,266	72,786	117,791	181,272	65,140	13,892	22,224	1,002,629
1939:															
Feb.	43,084	13,889	29,195	5,495	1,565	1,484	664	5,606	4,833	8,410	11,752	5,659	1,056	1,754	77,473
Mar.	43,259	14,035	29,224	3,718	1,392	1,177	344	5,401	5,361	8,048	14,487	4,636	1,331	1,776	76,932
Apr.	43,658	13,996	29,662	2,225	1,260	2,446	1,687	2,660	5,321	9,250	13,768	2,581	1,139	1,753	73,751
May	42,214	12,697	29,517	2,805	1,670	1,649	558	2,782	4,105	8,168	12,155	4,585	874	1,672	70,540
June	31,541	9,567	21,974	3,708	1,435	1,157	332	1,748	5,839	8,846	12,824	4,030	591	1,825	64,309
July	45,962	20,052	25,910	5,019	1,285	3,092	1,603	5,599	5,229	11,020	19,431	3,367	1,019	1,804	84,378
Aug.	53,497	12,635	40,862	5,620	416	1,749	975	5,230	6,236	10,010	11,232	7,020	1,197	1,525	92,072
Sept.	45,094	18,302	26,792	6,064	780	1,932	429	4,670	5,168	10,278	22,270	5,943	1,131	1,832	87,289
Oct.	70,839	21,493	49,346	5,234	815	2,487	1,730	2,047	9,950	13,645	21,404	5,022	1,414	2,185	115,279
Nov.	49,276	13,657	35,619	4,405	819	2,023	1,322	1,428	5,827	10,239	14,163	6,540	1,055	2,191	85,631
Dec.	41,568	8,479	33,089	9,496	2,565	2,476	616	1,177	8,130	8,580	7,156	11,018	1,377	2,052	87,732
1940:															
Jan.	56,214	30,136	26,078	7,091	1,630	1,987	1,858	5,469	6,361	16,070	31,676	5,315	1,777	2,000*	107,212
Feb.	62,105	16,598	45,507	8,741	2,076	2,678	1,164	3,887	7,270	14,873	15,713	7,040	1,781	2,000*	112,376
Mar.	65,269	17,565	47,704	5,406	2,054	3,526	1,050	3,111	8,864	13,415	20,015	3,551	1,298	2,000*	111,994
Apr.	47,430	22,106	25,324	4,309	2,173	2,951	1,799	4,000*	7,703	12,759	23,815	4,000*	1,582	2,000*	92,445

All figures from January, 1934, onward are net exports shown on a "dry rubber" basis as calculated by the International Rubber Regulation Committee. (1) Prior to January, 1934, Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex also is not included in the early years, which on a dry rubber basis was as follows: 1924—1,117 tons; 1925—3,618; 1926—3,263; 1927—2,439; 1928—2,247; 1929—3,574; 1930—2,750; 1931—1,940; 1932—5,193; 1933—10,470, and 1934—14,172 tons. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments on a dry rubber basis were: 1923—18 tons; 1924—90; 1925—6; 1926—20; 1927—½; 1928—1; 1929—2; 1930—11; 1931—2; 1932—2; 1933—1, and 1934—6 tons. (3) Official statistics. (4) Exports from "Other N. I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included in earlier years, which is as follows on a dry rubber basis: 1923—2,342 tons; 1924—1,008; 1925—2,239; 1926—44; 1927—84; 1928—1,395; 1929—437; 1930—2,744; 1931—3,874; 1932—3,488; 1933—5,260, and 1934—5,330 tons. (5) Calculated from official import statistics of principal consuming countries; also includes United States imports of guayule. (6) This total includes the third column for British Malaya and all other figures shown for other territories. (*) Figure is provisional.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,809
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,572	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	57,032	71,794	27,871	61,223	16,534	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,510
1937	592,394	92,707	59,871	98,170	36,088	62,311	24,733	30,462	19,164	14,970	4,343	4,680	2,400	13,063	1,055,356
1938	406,343	133,079	59,660	90,200	25,696	45,836	28,170	25,650	11,944	11,309	5,092	16,034	2,400	9,936	871,349
1939:															
Jan.	36,614	836	4,684	7,227	2,867	2,553	2,133	4,000*	910	898	454	1,037	200*	1,131	65,544
Feb.	30,578	4,773	5,315	7,569	1,451	3,263	2,025	2,000*	1,741	1,068	184	858	200*	524	61,549
Mar.	45,286	8,082	4,503	8,036	2,458	4,019	1,525	2,000*	1,316	1,242	368	1,133	200*	463	80,631
Apr.	31,590	4,752	5,639	8,719	1,466	3,579	1,926	2,000*	1,108	855	333	1,062	200*	597	63,826
May	45,390	7,531	4,646	8,413	3,006	4,438	1,573	2,000*	1,188	792	518	1,654	200*	618	81,967
June	33,951	8,439	4,649	8,190	2,423	3,067	1,992	2,000*	1,308	621	672	2,703	200*	487	70,702
July	36,932	4,040	4,282	8,437	3,164	3,668	1,350	1,000*	1,422	859	565	824	200*	412	67,155
Aug.	38,319	2,044	4,000*	....	2,033	3,145	1,500*	2,000*	2,182	952	651	1,546	200*	400*	58,972
Sept.	36,197	4,406	4,000*	....	2,639	9,254	1,500*	2,000*	875	108	222	1,200*	200*	...	63,572
Oct.	39,735	8,530	5,000*	....	3,787	2,749	1,500*	2,000*	1,235	519	653	1,200*	200*	...	69,589
Nov.	41,478	10,500*	5,000*	....	1,709	5,104	1,500*	2,000*	1,200*	667	613	1,200*	200*	...	71,504
Dec.	70,302	5,200*	5,000*	....	3,025	3,961	1,500*	2,000*	1,200*	1,035	1,827	1,200*	200*	...	94,702
1940:															
Jan.	71,541	450	5,000*	....	5,047	4,540	1,500*	2,000*	1,200*	.....	682	1,200*	200*	.....	.....
Feb.	41,797	7,500	5,000*	....	3,508	5,241	....	.....	.....	.....	495	1,200*	200*	.....	.....
Mar.	58,282	14,200	....	....	3,062	....	....	.....	.....	.....	.....	.....	.....	.....	.....
Apr.	70,135	16,400	....	....	....	....	....	.....	.....	.....	.....	.....	.....	.....	.....

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. i—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]—United States imports of guayule are included in this compilation. *—Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE: THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.